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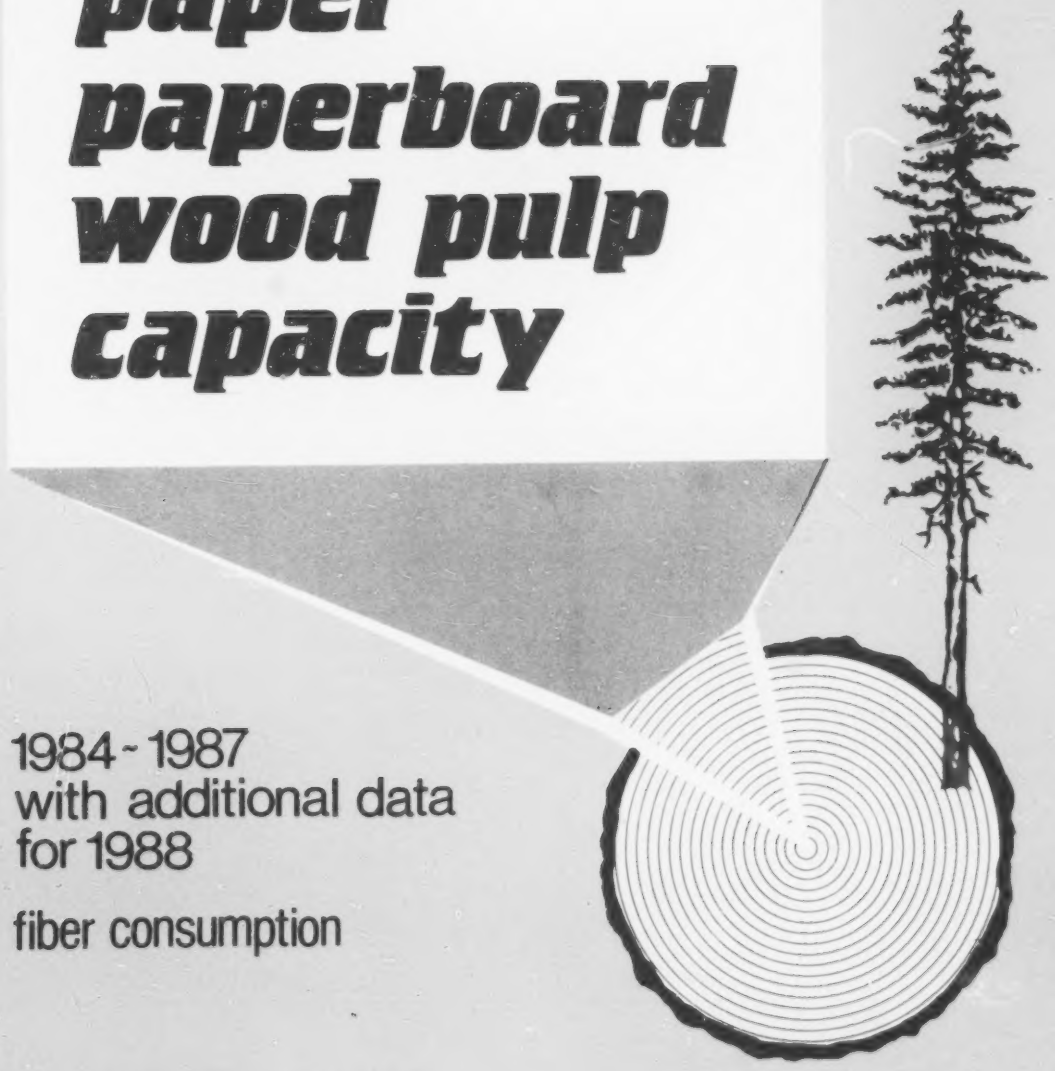
paper paperboard wood pulp capacity



1984 - 1987
with additional data
for 1988

fiber consumption

AMERICAN PAPER INSTITUTE
October 1985

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October 1985

COMMENTARY

Paper, paperboard and wood pulp producers plan to add 4.5 million tons to paper and paperboard capacity and 2.1 million tons to wood pulp capacity by 1988. Total capacity for paper and paperboard is expected to be 78.8 million tons in 1988 compared with 74.3 million tons in 1985, for an annual average growth rate of 2%. Wood pulp capacity will reach a total of 60.7 million tons in 1988, an annual rate averaging 1.2%. The lower growth rate for pulp compared with paper reflects increased integration of existing market pulp capacity as well as expanded use of recycled fiber. Capacity to produce market pulp experienced a significant 427,000 ton increase in 1985 but is now expected to lose 133,000 tons in the 1986-1988 period.

These are some of the results of the American Paper Institute's 28th annual survey of manufacturing capacity in paper, paperboard and wood pulp.

The projected growth patterns for individual product grades over the next three years vary considerably. Capacity for printing and writing papers, reflecting strong expansion in uncoated free sheet and coated papers, is expected to grow at a high 3.9% annual average rate. Tissue capacity will grow at a slower rate averaging 1.7% annually, in line with its historical rate of expansion. Almost no growth in capacity is reported for newsprint, and the already established decline in unbleached kraft packaging paper capacity will continue as major facilities are taken out of production and modified to produce other grades.

Unbleached kraft paperboard capacity in the three years ahead is estimated to grow 1.6% a year, considerably less than the annual rate of 2.5% in the 1976-1985 period. Producers of solid bleached and recycled paperboard plan to expand capacity at rates averaging 3.1% and 1.7% annually, and both of these rates of expansion are considerably higher than those achieved during the preceding ten years. Future growth in capacity for sulfate pulps which, in the ten years 1976-1985, has grown from a 67% to a 75% share of all wood pulp, will proceed at a modest rate averaging 1.2% annually through 1988.

TABLE 1:
GROWTH TRENDS IN CAPACITY

Thousands short tons

GRADES	ADDITIONS 1976-1985		ADDITIONS 1986-1988	
	10 YEAR INCREASE	AVERAGE ANNUAL GROWTH	3 YEAR INCREASE	AVERAGE ANNUAL GROWTH
TOTAL ALL GRADES PAPER & PAPERBOARD	**12,328**	**1.8%**	**4,429**	**1.9%**
TOTAL PAPER & PAPERBOARD	**14,164**	**2.1**	**4,464**	**2.0**
TOTAL PAPER	**8,655**	**2.7**	**2,492**	**2.2**
NEWSPRINT	1,972	4.2	53	0.3
PRINTING & WRITING	6,195	3.7	2,465	3.9
PACKAGING & IND. CONV.	(418)	(0.7)	(307)	(1.8)
TISSUE	906	1.9	281	1.7
TOTAL PAPERBOARD	**5,508**	**1.6**	**1,973**	**1.8**
UNBLEACHED KRAFT	3,911	2.5	886	1.6
SOLID BLEACHED	568	1.4	417	3.1
SEMICHEMICAL	879	1.8	221	1.3
RECYCLED	152	0.2	448	1.7
CONSTRUCTION GRADES	**(1,836)**	**(5.5)**	**(35)**	**(0.5)**
TOTAL ALL GRADES WOOD PULP	**10,160**	**1.9%**	**2,112**	**1.2%**
TOTAL WOOD PULP (excluding pulp for Construction Paper & Board)	**10,944**	**2.1**	**2,130**	**1.2**
DISSOLVING & SPECIAL ALPHA	(228)	(1.5)	(11)	(0.3)
SULFITE	(684)	(3.3)	20	0.4
SULFATE & SODA*	9,662	2.5	1,646	1.2
SEMICHEMICAL	472	1.1	74	0.5
MECHANICAL	1,721	3.5	402	2.2
WOOD PULP FOR CONSTRUCTION PAPER & BOARD	**(783)**	**(5.7)**	**(19)**	**(0.6)**

*Includes screenings

Not adjusted for rounding differences

An Emerging Trend

An important aspect of new facilities planning in the paper and paperboard industry, namely flexibility, has become more evident in our most recent capacity survey. In increasing numbers, major facilities that can no longer be operated economically to produce the grades for which they were originally designed are being modified to make completely different end products. In this survey, at least eight major paper machines with capacities aggregating more than 1,200,000 annual tons are being converted from the production of newsprint, unbleached kraft packaging papers, paperboard and bleached sulfate market pulp to produce printing and writing papers and recycled paperboard. We understand that these conversions are not makeshift adaptations to temporarily extend the useful lives of obsolete machines, but are extensive, carefully planned rebuilds that yield state-of-the-art equipment capable of producing quality products at competitive prices. This flexible approach to changes in market conditions insures the continued, cost-efficient operation of major production facilities. These conversions supplement the more customary capacity gains from both new mills and new machines and from improvements to existing plant and permit the industry to maintain capacity growth deemed consistent with demand for specific products.

Regional Capacity Growth

In a trend that is now well established, the South Atlantic and the East and West South Central regions of the U.S. continue their major role and, in 1984, accounted for 50% of all U.S. paper and paperboard capacity and 70% of all wood pulp capacity. In the four years 1985 through 1988, these regions will increase their share

TABLE 2:
COMPARISON OF CAPACITY ESTIMATES
FOR TOTAL PAPER & PAPERBOARD

Thousands short tons

SURVEY PUBLISHED IN:	ESTIMATES					
	1982	1983	1984	1985	1986	1987
1979	70,564					
1980	70,406	71,565				
1981	70,355	71,833	72,964			
1982	70,197	71,155	72,455	73,806		
1983	70,086*	70,814	71,965	73,054	74,084	
1984		71,126*	72,749	73,700	74,973	76,317
1985	--		73,098*	74,304	75,803	77,708
WIDEST ▸ DEVIATION FROM ACTUAL	0.7%	1.0%	1.6%			
	WIDEST RANGE ▸			1.7%	2.3%	1.8%

*Actual

TABLE 3:
ANNUAL CAPACITIES 1970-1988

Thousands short tons

YEAR	ANNUAL CAPACITY		CAPACITY ADDITIONS DURING YEAR		PERCENT INCREASE	
	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES
1970	53,260	57,195	1,140	1,221	2.2%	2.2%
1971	54,136	58,141	876	946	1.6	1.7
1972	55,873	59,965	1,671	1,824	3.1	3.1
1973	58,164	62,284	2,291	2,319	4.1	3.9
1974	59,527	63,779	1,363	1,495	2.3	2.4
1975	60,140	64,369	613	590	1.0	0.9
1976	61,307	65,673	1,167	1,304	1.9	2.0
1977	62,004	66,459	697	786	1.1	1.2
1978	63,091	67,419	1,087	960	1.8	1.4
1979	64,615	69,033	1,524	1,614	2.4	2.4
1980	66,368	70,716	1,753	1,683	2.7	2.4
1981	68,172	72,255	1,804	1,539	2.7	2.2
1982	70,086	73,118	1,914	863	2.8	1.2
1983	71,126	74,017	1,040	899	1.5	1.2
1984	73,098	75,943	1,972	1,926	2.8	2.6
1985E	74,304	76,696	1,206	753	1.6	1.0
1986E	75,803	78,158	1,499	1,462	2.0	1.9
1987E	77,708	80,063	1,905	1,905	2.5	2.4
1988E	78,768	81,125	1,060	1,062	1.4	1.3

E—Estimate

for paperboard and will provide 70% of all new expansion, including virtually all kraft paperboard and most new tissue capacity. Their share of wood pulp capacity will remain unchanged at 70%.

The Central region, during these years, will increase capacity share for semi-chemical paperboard with 78% of all new capacity, and for wood pulp with 20% of total additions. The Western region will achieve gains in capacity for recycled paperboard and printing and writing papers, while the Northeast will lose capacity share in each of the major grade categories.

Raw Materials Consumption

Based on producers' estimates in the summer and early fall of this year, the consumption of wood pulp, recyclable paper and other vegetable-based raw materials for papermaking should decline from 72,421,000 tons in 1984 to 72,220,000 tons in 1985. Similarly, pulpwood consumed in the manufacture of wood pulp should decline from 85,016,000 cords to 84,955,000. These reduced levels of consumption reflect expected cutbacks in the production of paper and paperboard for 1985 as a whole. Producers anticipate a return to more normal consumption levels in the years 1986 through 1988.

Wood pulp manufactured from forest and manufacturing residues, recyclable paper, cotton linters and other secondary materials comprises a major, and growing, portion of the fibrous raw materials used in paper and paperboard manufacture. From a 54.8% share of total fibers consumed in papermaking in 1984, these secondary fibers will grow to 55.3% in 1988.

PAPER AND PAPERBOARD

Newsprint

The last new newsprint machine in the

TABLE 4:
REGIONAL DISTRIBUTION–CAPACITY & CHANGES

GRADES	NORTHEAST		CENTRAL		SOUTH		WEST	
	SHARE OF U.S. CAPACITY 1984	SHARE OF U.S. CAPACITY CHANGES 1985-1988*	SHARE OF U.S. CAPACITY 1984	SHARE OF U.S. CAPACITY CHANGES 1985-1988*	SHARE OF U.S. CAPACITY 1984	SHARE OF U.S. CAPACITY CHANGES 1985-1988*	SHARE OF U.S. CAPACITY 1984	SHARE OF U.S. CAPACITY CHANGES 1985-1988*
PAPER & PAPERBOARD TOTAL†	16.6%	5.9%	20.1%	12.5%	50.1%	70.5%	13.2%	11.1%
PRINTING & WRITING	31.6	11.1	29.7	14.8	30.3	63.0	8.4	11.1
TISSUE	29.7	1.5	25.9	7.9	27.8	86.8	16.6	3.8
UNBL. KRAFT PAPERBOARD					83.1	93.3	16.9	6.7
SOLID BLEACHED PAPERBOARD	0.7	(0.2)	0.1		88.6	98.4	10.6	1.8
SEMICHEMICAL PAPERBOARD	1.9	(0.3)	32.4	48.1	51.1	53.8	14.6	(1.6)
RECYCLED PAPERBOARD	24.5	3.5	38.3	16.4	22.3	39.6	14.9	40.5
WOOD PULP TOTAL†	7.7%	2.4%	6.5%	19.1%	70.2%	70.2%	15.6%	8.3%
SULFATE & SODA	5.7	1.2	3.4	14.9	75.9	74.6	15.0	9.3
SEMICHEMICAL	11.0	2.4	30.1	33.5	46.6	76.1	12.3	(12.0)
MECHANICAL	19.5	15.8	10.9	53.9	47.2	18.6	22.4	11.7

*Percent change in four year period.
†Total of grades shown.

TABLE 5:
FIBER SOURCES FOR PAPER & PAPERBOARD MANUFACTURE

Thousands short tons

GRADES	1984		1985	1986	1987	1988	
	ANNUAL TONS	PERCENT	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	PERCENT
TOTAL CONSUMPTION	**72,421**	**100.0%**	**72,220**	**77,043**	**79,420**	**80,651**	**100.0%**
PRIMARY FIBERS	**32,748**	**45.2**	**32,338**	**34,549**	**35,588**	**36,065**	**44.7**
WOOD PULP	32,748	45.2	32,338	34,549	35,588	36,065	44.7
SECONDARY FIBERS	**39,673**	**54.8**	**39,882**	**42,494**	**43,832**	**44,586**	**55.3**
WOOD PULP	22,425	31.0	22,300	23,628	24,171	24,530	30.4
RECYCLABLE PAPER*	16,883	23.3	17,231	18,487	19,245	19,625	24.4
OTHER	365	0.5	351	379	416	431	0.5

Note: Consumption for 1986–1988 assumes capacity levels of production.
Includes the following tonnage consumed in the manufacture of molded pulp products: 1984, 159,000 tons; 1985, 176,000 tons; 1986-1988, 187,000 tons.

U.S. was brought on-stream in 1983, and this report is the second survey in which no significant gain in capacity for newsprint is expected. Miscellaneous increases, totaling only 53,000 tons, are reported for the three-year period 1986-1988. Canadian mills, which manufactured 58% of all newsprint consumed in the U.S. in 1984, are also reporting modest capacity increases. A recent Canadian Pulp and Paper Association survey reports net capacity gains of only 198,000 annual tons in the two-year period 1986-1987. On the basis of the U.S. and Canadian surveys, North American newsprint capacity in 1987 is estimated at 16,873,000 tons.

A new wood pulp-based newsprint mill under active consideration in the Pacific Northwest and a new recycled newsprint mill under study in California remain possibilities for future U.S. expansion. These have not been included in our numbers.

Printing and Writing Papers

Continuing the past trend of expansion, producers report plans for strong gains in printing and writing paper capacity. Seven new paper machines and several planned conversions of existing machines from the production of other grades are scheduled to come into operation in the years 1986 through 1988. Almost 2.5 million tons of new printing and writing paper capacity are reported for these years, an annual average growth rate of 3.9%. This gain should bring the potential annual production of printing and writing papers to 22,935,000 tons in 1988. Uncoated free sheet papers and coated papers, the major printing and writing grade categories, will account for almost all new capacity gains and will grow at annual rates averaging 4.0% and 5.2% respectively.

Kraft Packaging Papers

Capacity for unbleached kraft packaging papers, which declined by 93,000 tons in 1984 and by a further estimated 110,000 tons in 1985, is now expected to be reduced by an additional 423,000 tons over the next three years. These reductions will comprise an overall 15% loss in capacity within a five-year period and will bring the industry capacity level to 3,439,000 tons in 1988. In previous reports, we have commented on the eroding market conditions, including competition from alternative packaging materials, that underlie the decline in demand for unbleached kraft packaging papers. It is, however, encouraging to note that many of the idled facilities have been converted to the production of other grades of paper and paperboard, including uncoated free sheet, and their capacities have not been lost to the industry as a whole.

Tissue

Capacity for tissue papers is expected to increase by 281,000 tons in the 1986-1988 period—a rate of growth averaging 1.7% annually. Due to a cancelled expansion project, this steady rate of increase in manufacturing capacity is somewhat lower than the growth estimates reported for three future years in last year's survey. It does, however, closely approximate the 1.9% average annual growth rate achieved over the last ten years. Three new tissue machines, including two machines in a completely new mill, will provide most of the new capacity during this period.

Unbleached Kraft Paperboard

No new unbleached kraft paperboard mills are reported in this survey, and, after the 1986 start-up of a new machine that will replace existing capacity in a Southern mill, all capacity increases will be provided by rebuilds and incremental improvements in existing facilities and by swing tonnage from other grades. Given, however, the large capacity base (18,000,000 tons annually) for unbleached kraft paperboard, the increases are quite substantial and are expected to yield 880,000 tons of new capacity in the three-year period 1986-1988.

While growth estimates for kraft paperboard capacity are higher than those reported in last year's survey, and represent a 1.6% average annual increase through 1988, they fall short of the secular growth rate for these grades, which has averaged 2.5% annually over the previous ten years.

Solid Bleached Paperboard

Following a strong 190,000-ton, or 4.5%, gain in solid bleached paperboard capacity in 1985, further expansions, including a new machine in the South Atlantic region, should yield 417,000 additional tons over the three-year period 1986-1988. This rate of growth in capacity, which will average 3.1% annually, is considerably higher than the 1.4% average annual growth rate from 1976 through 1985. While much of the capacity expansion rests on plans for new or improved manufacturing facilities and can be expected to remain in the system, a substantial 112,000 annual tons represent machine swings to bleached paperboard from the production of bleached kraft market pulp. Swings of this type are often related to near-term market conditions, and it should be noted that producers are able to reschedule their product mix on short notice.

Semichemical Paperboard

Although no major capacity projects for semichemical paperboard are included in this survey, the start-up of an idle machine and a series of miscellaneous improvements contributed to a strong 163,000-ton, or 3.1%, increase in capacity in 1985. For the remaining years in the survey, growth in capacity is expected to average only 1.3% annually bringing capacity to a level of 5,636,000 tons in 1988. During this same three-year period, capacity for

recycled corrugating medium, a companion grade in containerboard manufacture, is expected to increase at a rate averaging 3.4% annually.

Recycled Paperboard

Two important recycled paperboard expansion projects are included in this survey—a new recycled linerboard mill, the first in several years, scheduled to start up in California in late 1985, and the conversion to recycled containerboard production of a large kraft linerboard machine in 1987. These expansions, together with capacity enhancement projects scheduled in many other mills, will contribute to a 5% increase in capacity totaling 448,000 tons in the next three years, and will bring the manufacturing potential for recycled paperboard to 9,317,000 tons by 1988. Almost all of the capacity increases are in recycled linerboard and corrugating medium and are net of approximately 100,000 tons of idled capacity which has been removed from our estimates.

While the rate of capacity growth for recycled paperboard in not comparable to some of the faster-growing industry segments, it will constitute the largest three-year increase in recycled paperboard capacity in more than ten years.

WOOD PULP GRADES

Dissolving Pulps

Over the past fifteen years, capacity for dissolving pulps has either remained flat or fluctuated in a very narrow range. No new mills or major expansion projects have been undertaken during these years, and most capacity fluctuations have reflected production swings between dissolving and paper grade pulps dictated by market conditions. A continuation of this trend is reported in this survey, and a small loss of 55,000 annual tons will reduce total dissolving pulp capacity from 1,487,000 tons in 1984 to 1,432,000 tons in 1988.

Sulfite Pulps

Between 1970 and 1981, the sulfite pulping sector of the industry experienced a long-term decline in which capacity in place was reduced by 23% or almost 550,000 tons and the number of mills declined from 41 to 22. Since 1982, however, capacity for these pulps has stabilized at between 1,700,000 and 1,800,000 annual tons. This survey shows a continuation of this stability, and capacity is reported at a flat 1,750,000-ton level over the next three years.

Sulfate and Soda Pulps

Additions to sulfate and soda pulp capacity are expected to total 1,646,000 tons in the three-year period 1986-1988, with all of the increase occurring in the bleached and semibleached grades. Unbleached pulping capacity will decline slightly during these years as bleaching facilities are installed or enlarged to support the conversion of paper machines from unbleached kraft papers to the production of white papers.

At a rate averaging only 1.2% annually through 1988, the U.S. industry's capacity growth for sulfate pulps will trail the 2.5% average growth rate of the last ten years as well as the rates of capacity expansion of the major paper and paperboard products that constitute their end uses.

Mechanical Pulps

In recent years, capacity changes in mechanical pulps have been characterized by dynamic growth in the relatively new thermomechanical pulps (TMP) at the expense of static or declining capacity levels for stone groundwood pulp, a grade for which they can readily substitute. In 1980, at a capacity level of 1.4 million tons annually, TMP comprised 27% of all mechanical pulps. By 1984, at 2.5 million tons, their share had increased to 40%. Further strong growth, accompanied by planned closures and conversions of stone groundwood mills, will bring TMP capacity in 1988 to 2,904,000 annual tons, or a 46% share of all mechanical pulping capacity.

Market Pulp

Two large greenfield bleached chemical paper-grade market pulp mills began operation in 1984 and 1985 and, as reported in our survey last year, contributed to a gain of more than 427,000 tons, or 5.7%, in market pulp capacity for 1985 alone. In direct contrast, capacity over the next three years is expected to decline by 123,000 annual tons to a level of 7,824,000 tons in 1988—some 240,000 tons below the estimate for 1987 reported in our survey last year.

For the most part, these capacity losses represent the integration of market pulp to own use as companies expand their papermaking capacity.

Norma Pace

Norma Pace
Senior Vice President
October 1985

PAPER & PAPERBOARD

capacity summary annual

Practical Maximum Basis
Thousands short tons

GRADES	1984	1985	1986	1987	1988*
TOTAL ALL GRADES	**75,943**	**76,696**	**78,158**	**80,063**	**81,125**
Total Paper & Paperboard	**73,098**	**74,304**	**75,803**	**77,708**	**78,768**
Total Paper	**37,106**	**37,577**	**38,200**	**39,327**	**40,069**
NEWSPRINT	5,851	5,820	5,825	5,850	5,873
PRINTING WRITING & RELATED	19,890	20,470	21,189	22,343	22,935
Uncoated Groundwood	1,704	1,644	1,625	1,633	1,634
Coated Groundwood	3,766	3,907	4,116	4,385	4,534
Coated Free Sheet	2,791	2,815	2,868	3,116	3,300
Uncoated Free Sheet	10,058	10,562	11,030	11,631	11,868
Cotton Fiber	181	188	187	192	193
Thin Papers	338	330	330	330	330
Solid Bleached Bristols	1,051	1,023	1,032	1,056	1,075
PACKAGING & IND. CONV.	6,088	5,950	5,741	5,592	5,643
Unbleached Kraft	3,972	3,862	3,619	3,423	3,439
Bleached Packaging & Ind. Conv.	599	552	576	580	581
Specialty Packaging	549	541	534	542	542
Special Industrial	968	996	1,011	1,047	1,080
TISSUE	5,276	5,338	5,446	5,543	5,619
Total Paperboard	**35,992**	**36,726**	**37,603**	**38,381**	**38,699**
UNBLEACHED KRAFT	17,834	18,068	18,370	18,739	18,954
of which Kraft Linerboard	16,565	16,780	17,090	17,446	17,596
SOLID BLEACHED	4,185	4,375	4,664	4,761	4,792
SEMICHEMICAL	5,252	5,415	5,493	5,612	5,636
RECYCLED	8,722	8,869	9,077	9,268	9,317
Total Construction Paper & Board and Other	**2,845**	**2,392**	**2,355**	**2,356**	**2,357**

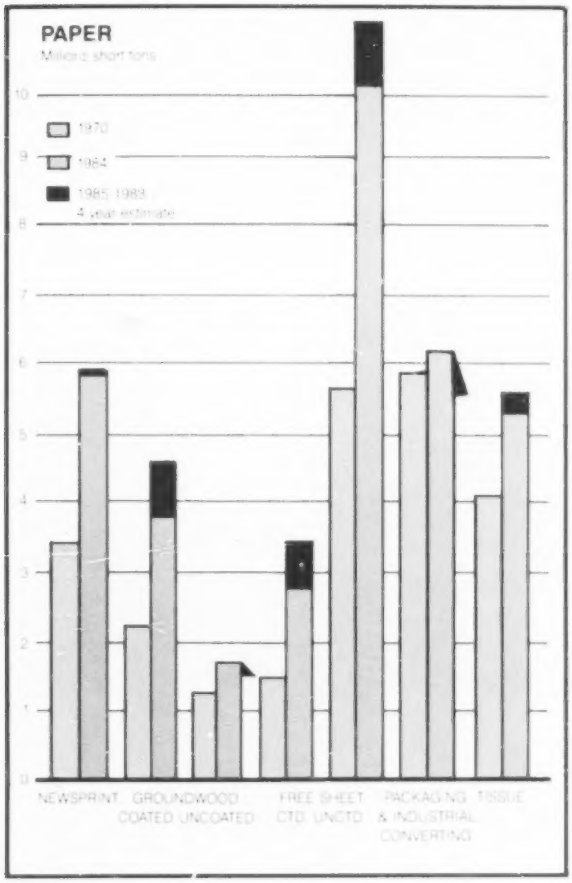
*Capacity additions presented here for 1988 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

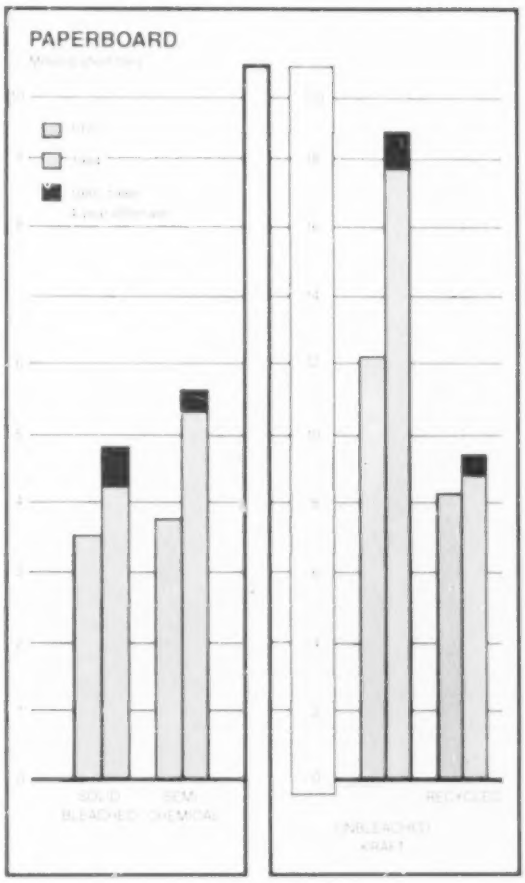
Totals not adjusted for rounding differences.

capacity reductions—paper and paperboard mills

	1970-1975			1976-1979		
Grades	Number of Machines	Number of Complete Mills	Annual Capacity	Number of Machines	Number of Complete Mills	Annual Capacity
TOTAL	**183**	**56**	**3,514**	**105**	**27**	**2,606**
Paper & Paperboard						
Newsprint	—	—	—	3	1	231
Printing-Writing	68	13	1,062	27	3	468
Pkg. & Ind. Conv.	24	6	222	24	4	357
Tissue	24	8	250	16	5	154
Unbl. Kraft	2	—	128	1	1	240
Bl. Kraft	2	—	61	2	1	162
Semichemical	6	2	248	2	—	145
Recycled	49	23	1,362	19	5	630
Construction Paper & Board	8	4	181	11	7	219

capacity/annual growth comparison





and machines shutdown

Thousands short tons

Grades	1980-1983 Number of Machines	1980-1983 Number of Complete Mills	1980-1983 Annual Capacity Removed from Survey	1980-1983 Annual Capacity Not Removed from Survey	1984-1988 Number of Machines	1984-1988 Number of Complete Mills	1984-1988 Annual Capacity Removed from Survey	1984-1988 Annual Capacity Not Removed from Survey
TOTAL	**208**	**93**	**5,410**	**194**	**59**	**19**	**1,743**	**107**
Paper & Paperboard								
Newsprint	1	—	26	—	—	—	—	—
Printing-Writing	28	4	589	44	7	2	122	—
Pkg. & Ind. Conv.	24	8	309	—	14	2	599	28
Tissue	28	12	309	—	10	4	90	—
Unbl. Kraft	5	—	722	—	2	—	385	—
Bl. Kraft	—	—	—	—	1	—	95	—
Semichemical	8	2	496	—	—	—	—	—
Recycled	31	15	1,061	105	6	4	100	65
Construction Paper & Board	83	52	1,898	45	19	7	352	14

Shutdowns represent machines and mills reported to the API as permanent or indefinite closures and have been removed from capacity totals. Not all of the facilities have been dismantled and some portion of their productive capacity could be restored.

capacity summary annual

Practical Maximum Basis
Thousands short tons

GRADES	1984	1985	1986	1987	1988*
TOTAL ALL GRADES WOOD PULP	**59,001**	**59,587**	**60,570**	**61,323**	**61,699**
Total Wood Pulp (exc. pulp for Construction Paper & Board)	**57,742**	**58,603**	**59,604**	**60,357**	**60,733**
DISSOLVING	1,487	1,443	1,438	1,437	1,432
CHEMICAL PAPER GRADES	45,479	46,447	47,164	47,708	48,112
SULFITE PAPER GRADES	1,750	1,736	1,747	1,748	1,756
SULFATE & SODA PAPER GRADES	43,729	44,710	45,416	45,960	46,356
Bleached & Semibleached Softwood	12,490	12,956	13,236	13,472	13,617
Bleached & Semibleached Hardwood	9,867	10,588	11,063	11,414	11,598
Unbleached	21,372	21,166	21,117	21,074	21,141
SEMICHEMICAL	4,625	4,718	4,753	4,780	4,792
MECHANICAL	6,122	5,968	6,223	6,405	6,370
SCREENINGS	29	26	26	26	26
Total Wood Pulp for Construction Paper & Board†	**1,259**	**985**	**966**	**966**	**966**

TOTAL MACHINE DRIED WOOD PULP	**9,755**	**10,244**	**10,379**	**10,157**	**10,139**
DISSOLVING	1,487	1,443	1,438	1,437	1,432
CHEMICAL PAPER GRADES	8,157	8,686	8,824	8,602	8,588
SULFITE PAPER GRADES	401	389	389	389	389
SULFATE & SODA PAPER GRADES	7,756	8,296	8,435	8,212	8,199
Bleached & Semibleached	7,610	8,151	8,257	8,031	8,018
Unbleached	146	145	178	181	181
ALL OTHER	110	115	117	118	119

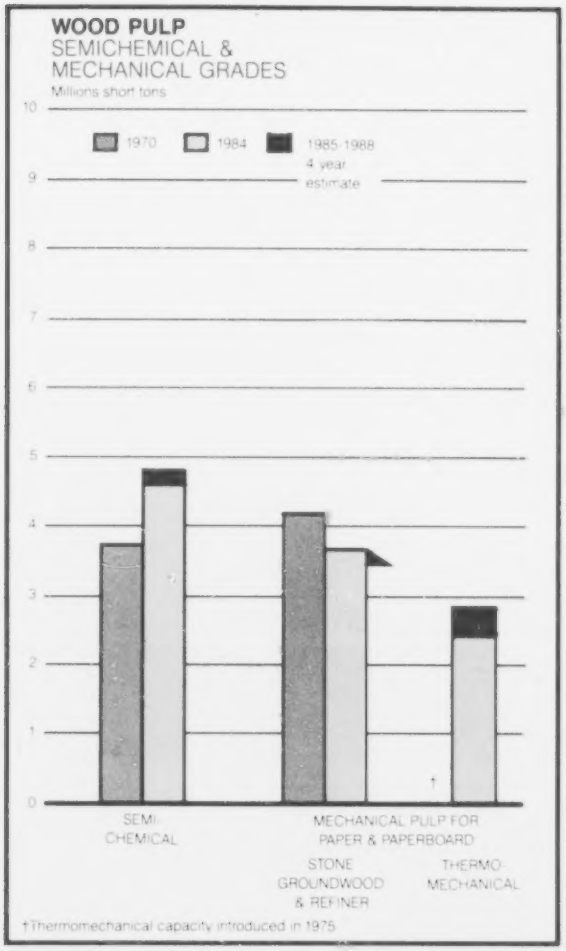
*Capacity additions presented here for 1988 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

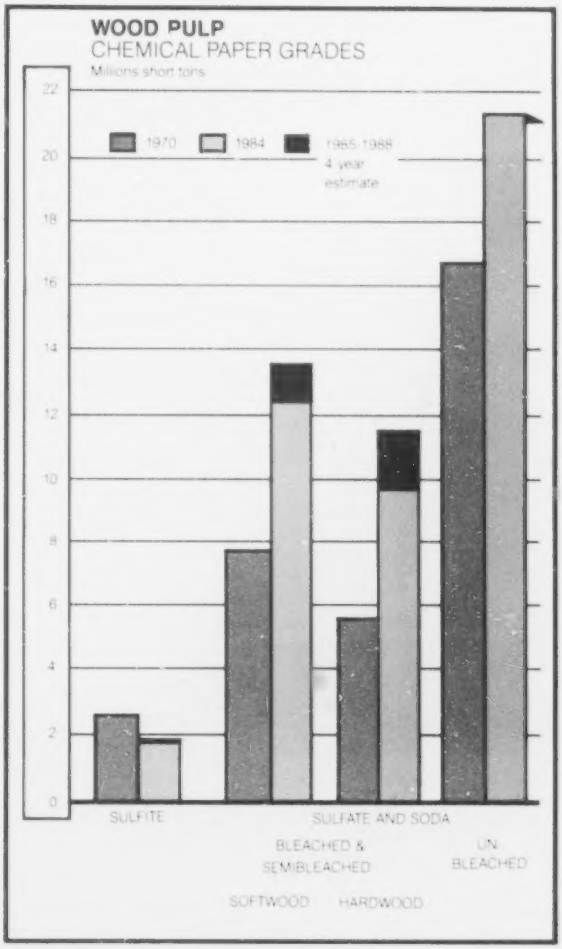
†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

capacity/annual growth comparison

capacity/annual growth comparison





Practical Maximum Basis
Thousands short tons

GRADES	1984	1985	1986	1987	1988*
TOTAL MARKET WOOD PULP	**7,530**	**7,957**	**8,047**	**7,830**	**7,824**
DISSOLVING	1,487	1,443	1,438	1,437	1,432
CHEMICAL PAPER GRADES	6,029	6,499	6,593	6,376	6,376
SULFITE PAPER GRADES	302	297	297	297	297
SULFATE & SODA PAPER GRADES	5,727	6,202	6,296	6,079	6,079
Bleached & Semibleached	5,582	6,057	6,118	5,899	5,899
Unbleached	145	145	177	180	180
ALL OTHER	14	15	16	16	16

Based on information provided by producers. Reflects diversion of drying capacity to and from own use, installation of new equipment and retirement of existing equipment.

Totals not adjusted for rounding differences.

**Capacity additions presented here for 1988 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

PAPER BY GRADE

capacity/annual • year end • daily

	ALL GRADES PAPER & PAPER-BOARD Total	PAPER & PAPER-BOARD Total		Practical Maximum Basis Thousands short tons	PAPER Total	NEWS-PRINT Total	Total	Uncoated Ground-wood
ANNUAL CAPACITY 1984-1988	**75,943**	**73,098**	**1984**	**Annual Capacity**	**37,106**	**5,851**	**19,890**	**1,704**
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	337	335		New Machines	315	—	199	—
	416	871		Net Improvements	157	(32)	381	(60)
	76,696	**74,304**	**1985**	**Annual Capacity**	**37,577**	**5,820**	**20,470**	**1,644**
	913	913		New Machines	342	—	248	—
	549	587		Net Improvements	281	5	471	(19)
	78,158	**75,803**	**1986**	**Annual Capacity**	**38,200**	**5,825**	**21,189**	**1,625**
	851	851		New Machines	697	—	628	—
	1,054	1,054		Net Improvements	430	25	526	7
	80,063	**77,708**	**1987**	**Annual Capacity**	**39,327**	**5,850**	**22,343**	**1,633**
	429	429		New Machines	429	—	369	—
	632	630		Net Improvements	312	23	223	2
	81,125	**78,768**	**1988***	**Annual Capacity**	**40,069**	**5,873**	**22,935**	**1,634**
YEAR END CAPACITY 1984-1988	**76,703**	**74,001**	**1984**	**Year End Capacity**	**37,630**	**5,816**	**20,215**	**1,682**
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	430	427		New Machines	252	—	155	—
	35	385		Net Improvements	(213)	(11)	377	(50)
	77,168	**74,813**	**1985**	**Year End Capacity**	**37,670**	**5,805**	**20,747**	**1,632**
	1,099	1,099		New Machines	529	—	459	—
	691	691		Net Improvements	361	31	498	—
	78,959	**76,603**	**1986**	**Year End Capacity**	**38,560**	**5,836**	**21,704**	**1,632**
	745	745		New Machines	745	—	654	—
	992	992		Net Improvements	494	15	374	1
	80,696	**78,340**	**1987**	**Year End Capacity**	**39,799**	**5,851**	**22,732**	**1,633**
	301	301		New Machines	301	—	210	—
	509	506		Net Improvements	265	24	179	3
	81,506	**79,147**	**1988***	**Year End Capacity**	**40,365**	**5,875**	**23,122**	**1,636**
YEAR END DAILY RATE 1984-1988	352	353	**1984**	Available Days	354	358	355	358
	218.01	**209.77**		**Daily Rate**	**106.18**	**16.25**	**56.87**	**4.69**
	352	353	**1985**	Available Days	354	358	355	358
	219.41	**212.15**		**Daily Rate**	**106.34**	**16.22**	**58.44**	**4.55**
	352	353	**1986**	Available Days	354	358	355	358
	224.45	**217.18**		**Daily Rate**	**108.84**	**16.30**	**61.14**	**4.56**
	352	353	**1987**	Available Days	354	358	355	358
	229.38	**222.12**		**Daily Rate**	**112.35**	**16.34**	**64.06**	**4.56**
	352	353	**1988***	Available Days	354	358	355	358
	231.68	**224.40**		**Daily Rate**	**113.95**	**16.41**	**65.16**	**4.57**

*Capacity additions presented here for 1988 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

PRINTING, WRITING & RELATED						PACKAGING & INDUSTRIAL CONVERTING					TISSUE
Coated Ground-wood	Coated Free Sheet	Uncoated Free Sheet	Cotton Fiber	Thin Papers	Solid Bleached Bristols	Total	Un-bleached Kraft	Bleached Packaging & Industrial Converting	Specialty Packaging	Special Industrial	Total
3,766	**2,791**	**10,058**	**181**	**338**	**1,051**	**6,088**	**3,972**	**599**	**549**	**968**	**5,276**
—	14	184	—	—	—	5		5	—		111
141	9	319	7	(7)	(27)	(143)	(111)	(52)	(8)	28	(50)
3,907	**2,815**	**10,562**	**188**	**330**	**1,023**	**5,950**	**3,862**	**552**	**541**	**996**	**5,338**
68	16	163	1			2		2			92
142	37	305	(1)	—	9	(211)	(242)	23	(7)	15	16
4,116	**2,868**	**11,030**	**187**	**330**	**1,032**	**5,741**	**3,619**	**576**	**534**	**1,011**	**5,446**
177	213	220	7	—	12	—	—	—	—	—	69
92	35	381	(2)	—	12	(149)	(196)	4	7	36	28
4,385	**3,116**	**11,631**	**192**	**330**	**1,056**	**5,592**	**3,423**	**580**	**542**	**1,047**	**5,543**
101	161	89	—	—	18	—	—	—	—	—	61
49	23	148	1	—	—	50	17	—		33	15
4,534	**3,300**	**11,868**	**193**	**330**	**1,075**	**5,643**	**3,439**	**581**	**542**	**1,080**	**5,619**
3,815	**2,867**	**10,268**	**189**	**336**	**1,059**	**5,273**	**4,029**	**684**	**537**	**1,023**	**5,327**
—	—	155	—	—	—	7	—	7	—	—	91
116	(36)	393	(2)	(6)	(38)	(565)	(383)	(150)	(2)	(30)	(14)
3,931	**2,831**	**10,816**	**187**	**330**	**1,020**	**5,715**	**3,646**	**541**	**534**	**993**	**5,403**
131	122	198	8	—	—	—	—	—	—	—	70
197	35	245	(3)	—	24	(176)	(243)	39	7	22	7
4,259	**2,987**	**11,260**	**191**	**330**	**1,044**	**5,539**	**3,403**	**580**	**542**	**1,015**	**5,480**
155	268	201	—	—	30	—	—	—	—	—	91
39	33	300	1	—	1	77	39	1	—	36	29
4,453	**3,288**	**11,761**	**193**	**330**	**1,075**	**5,616**	**3,442**	**581**	**542**	**1,051**	**5,600**
210	—	—	—	—	—	—	—	—	—	—	91
25	21	129	1	—	—	29	(5)	—	—	34	33
4,688	**3,309**	**11,890**	**194**	**330**	**1,075**	**5,645**	**3,437**	**581**	**542**	**1,085**	**5,724**
358	358	355	320	339	356	348	353	351	350	330	353
10.66	**8.02**	**28.94**	**.59**	**.99**	**2.97**	**18.00**	**11.42**	**1.95**	**1.53**	**3.10**	**15.07**
357	357	354	319	339	356	349	353	351	352	329	354
11.01	**7.93**	**30.53**	**.59**	**.97**	**2.86**	**16.40**	**10.32**	**1.54**	**1.52**	**3.02**	**15.28**
357	357	354	319	339	356	348	354	351	352	329	354
11.93	**8.37**	**31.79**	**.60**	**.97**	**2.93**	**15.90**	**9.62**	**1.65**	**1.54**	**3.08**	**15.50**
357	356	354	319	339	356	348	354	351	352	329	354
12.47	**9.23**	**33.21**	**.60**	**.97**	**3.02**	**16.12**	**9.73**	**1.65**	**1.54**	**3.19**	**15.83**
357	356	354	319	339	356	348	354	351	352	330	354
13.14	**9.29**	**33.56**	**.61**	**.97**	**3.02**	**16.20**	**9.72**	**1.65**	**1.54**	**3.29**	**16.17**

Totals not adjusted for rounding differences

PAPERBOARD BY GRADE

capacity/annual • year end • daily

			PAPER-BOARD	UNBLEACHED KRAFT PAPERBOARD				SOLID BLEACHED PACKAGING PAPERBOARD				
		Practical Maximum Basis *Thousands short tons*	Total	Total	Liner-board	Folding	Other	Total	Liner-board	Folding	Milk Carton & Food Service	Other
ANNUAL CAPACITY 1984-1988	**1984**	**Annual Capacity**	**35,992**	**17,834**	**16,565**	**792**	**477**	**4,185**	**119**	**2,095**	**1,771**	**200**
		New Machines	20	—	—	—	—	—	—	—	—	—
		Net Improvements	714	234	215	36	(18)	190	14	228	(44)	(8)
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	**1985**	**Annual Capacity**	**36,726**	**18,068**	**16,780**	**828**	**459**	**4,375**	**133**	**2,323**	**1,727**	**192**
		New Machines	571	231	200	2	28	185	—	185	—	—
		Net Improvements	306	71	109	(2)	(36)	104	—	83	16	5
	1986	**Annual Capacity**	**37,603**	**18,370**	**17,090**	**829**	**452**	**4,664**	**133**	**2,590**	**1,743**	**197**
		New Machines	154	84	73	1	10	70	—	70	—	—
		Net Improvements	624	286	283	6	(3)	28	—	—	26	2
	1987	**Annual Capacity**	**38,381**	**18,739**	**17,446**	**835**	**459**	**4,761**	**133**	**2,660**	**1,769**	**199**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	318	215	150	64	—	31	—	15	16	—
	1988*	**Annual Capacity**	**38,699**	**18,954**	**17,596**	**899**	**459**	**4,792**	**133**	**2,675**	**1,784**	**199**
YEAR END CAPACITY 1984-1988	**1984**	**Year End Capacity**	**36,371**	**18,028**	**16,760**	**807**	**460**	**4,199**	**134**	**2,112**	**1,762**	**191**
		New Machines	175	—	—	—	—	—	—	—	—	—
		Net Improvements	598	148	128	22	(2)	296	—	361	(68)	3
Year End Capacity is calculated by multipying Daily Rate by number of Available Days	**1985**	**Year End Capacity**	**37,144**	**18,176**	**16,888**	**829**	**459**	**4,495**	**133**	**2,473**	**1,694**	**194**
		New Machines	570	315	273	3	39	255	—	255	—	—
		Net Improvements	330	138	180	(3)	(39)	—	—	(82)	78	5
	1986	**Year End Capacity**	**38,043**	**18,629**	**17,341**	**829**	**459**	**4,749**	**133**	**2,646**	**1,771**	**199**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	497	217	147	70	—	28	—	31	(3)	—
	1987	**Year End Capacity**	**38,541**	**18,846**	**17,488**	**899**	**459**	**4,778**	**133**	**2,677**	**1,769**	**199**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	241	171	171	—	—	18	—	—	17	—
	1988*	**Year End Capacity**	**38,782**	**19,017**	**17,659**	**899**	**459**	**4,795**	**133**	**2,677**	**1,786**	**199**
YEAR END DAILY RATE 1984-1988	**1984**	Available Days	351	354	354	348	356	357	340	358	357	359
		Daily Rate	**103.58**	**50.91**	**47.30**	**2.32**	**1.29**	**11.76**	**.39**	**5.91**	**4.94**	**.53**
	1985	Available Days	351	354	354	353	355	357	340	358	357	357
		Daily Rate	**105.81**	**51.35**	**47.71**	**2.35**	**1.29**	**12.58**	**.39**	**6.91**	**4.74**	**.54**
	1986	Available Days	351	354	354	353	355	357	340	358	357	357
		Daily Rate	**108.34**	**52.63**	**48.99**	**2.35**	**1.29**	**13.29**	**.39**	**7.38**	**4.96**	**.56**
	1987	Available Days	351	354	354	352	355	357	340	358	357	357
		Daily Rate	**109.77**	**53.25**	**49.40**	**2.55**	**1.29**	**13.38**	**.39**	**7.47**	**4.95**	**.56**
	1988*	Available Days	351	354	354	352	355	357	340	358	357	357
		Daily Rate	**110.46**	**53.73**	**49.89**	**2.55**	**1.29**	**13.42**	**.39**	**7.48**	**5.00**	**.56**

*Capacity additions presented here for 1988 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

CONSTRUCTION PAPER & BOARD BY GRADE

SEMI-CHEMICAL PAPERBOARD	RECYCLED PAPERBOARD								CONSTRUCTION PAPER & BOARD & WET MACHINE BOARD			
Total	Total	Linerboard	Corrugating Medium	Container Chip & Filler	Folding	Set-up	Gypsum Wall Board Facing	Other	Total	Construction Paper	Wet Machine Board	Insulating Board
5,252	**8,722**	**393**	**1,524**	**228**	**2,626**	**296**	**1,249**	**2,405**	**2,845**	**1,227**	**170**	**1,449**
—	20	20	—	—	—	—	—	—	2	—	2	—
162	127	7	31	(15)	17	9	53	25	(455)	(235)	(6)	(213)
5,415	**8,869**	**420**	**1,555**	**213**	**2,644**	**305**	**1,303**	**2,430**	**2,392**	**991**	**165**	**1,236**
—	155	155	—	—	—	—	—	—	1	—	1	—
78	53	—	15	2	15	1	8	13	(38)	(18)	(1)	(20)
5,493	**9,077**	**575**	**1,570**	**215**	**2,658**	**305**	**1,310**	**2,443**	**2,355**	**973**	**165**	**1,216**
—	—	—	—	—	—	—	—	—	—	—	—	—
119	191	28	128	—	19	1	2	14	1	1	—	—
5,612	**9,268**	**603**	**1,698**	**215**	**2,677**	**306**	**1,312**	**2,458**	**2,356**	**974**	**165**	**1,216**
—	—	—	—	—	—	—	—	—	—	—	—	—
23	49	3	21	—	10	—	2	14	2	—	1	—
5,636	**9,317**	**605**	**1,718**	**215**	**2,687**	**307**	**1,314**	**2,471**	**2,357**	**975**	**167**	**1,216**
5,383	**8,761**	**398**	**1,542**	**209**	**2,628**	**305**	**1,261**	**2,419**	**2,702**	**1,084**	**165**	**1,453**
—	175	175	—	—	—	—	—	—	2	—	2	—
48	106	2	14	6	21	—	49	14	(350)	(110)	(2)	(237)
5,431	**9,043**	**575**	**1,556**	**215**	**2,649**	**305**	**1,310**	**2,433**	**2,354**	**973**	**165**	**1,216**
—	—	—	—	—	—	—	—	—	—	—	—	—
133	59	—	19	—	22	1	1	16	1	1	—	—
5,564	**9,102**	**575**	**1,575**	**215**	**2,672**	**306**	**1,311**	**2,449**	**2,355**	**974**	**165**	**1,216**
—	—	—	—	—	—	—	—	—	—	—	—	—
59	193	30	137	—	9	1	2	14	1	1	—	—
5,622	**9,295**	**605**	**1,712**	**215**	**2,681**	**307**	**1,313**	**2,463**	**2,356**	**975**	**165**	**1,216**
—	—	—	—	—	—	—	—	—	—	—	—	—
20	32	—	10	—	9	—	2	12	2	—	2	—
5,642	**9,328**	**605**	**1,722**	**215**	**2,690**	**307**	**1,314**	**2,475**	**2,359**	**975**	**168**	**1,216**
354	341	352	349	337	338	333	339	338	328	340	306	322
15.19	**25.72**	**1.13**	**4.42**	**.62**	**7.78**	**.92**	**3.71**	**7.15**	**8.24**	**3.19**	**.54**	**4.51**
354	341	352	348	337	339	333	339	338	324	339	306	316
15.34	**26.53**	**1.64**	**4.47**	**.64**	**7.82**	**.92**	**3.86**	**7.20**	**7.26**	**2.87**	**.54**	**3.85**
354	341	352	348	337	339	333	339	338	324	339	306	316
15.72	**26.70**	**1.64**	**4.52**	**.64**	**7.89**	**.92**	**3.86**	**7.24**	**7.26**	**2.87**	**.54**	**3.85**
354	341	351	349	337	339	333	339	338	324	339	306	316
15.88	**27.26**	**1.72**	**4.91**	**.64**	**7.92**	**.92**	**3.87**	**7.28**	**7.27**	**2.87**	**.54**	**3.85**
354	341	351	348	337	339	333	339	338	324	339	305	316
15.94	**27.36**	**1.72**	**4.94**	**.64**	**7.94**	**.92**	**3.87**	**7.32**	**7.28**	**2.87**	**.55**	**3.85**

Totals not adjusted for rounding differences.

WOOD PULP BY GRADE

capacity/annual • year end • daily

for paper & paperboard

for construction paper & board

		Practical Maximum Basis	ALL GRADES WOOD PULP	WOOD PULP (exc. pulp for Construction Paper & Board)	DISSOLVING	CHEMICAL PAPER GRADES								SEMICHEMICAL			MECHANICAL				SCREENINGS	WOOD PULP FOR CONSTRUCTION PAPER & BOARD		
							SULFITE			SULFATE		AND SODA												
		Thousands short tons								Bleac Semibl		hed & eached						Stone Ground-wood		Thermo-mechan-ical				
			Total	Total	Total	Total	Total	Bleached	Unbleached	Total	Hardwood	Softwood	Unbleached	Total	Bleached	Unbleached	Total	Stone Ground-wood	Refiner	Thermo-mechan-ical	Total	Total	Stone Ground-wood & Refiner	Defib-rated Exploded†
ANNUAL CAPACITY 1984-1988	**1984**	**Annual Capacity**	**59,001**	**57,742**	**1,487**	**45,479**	**1,750**	**1,445**	**305**	**43,729**	**9,867**	**12,490**	**21,372**	**4,625**	**381**	**4,244**	**6,122**	**3,168**	**501**	**2,453**	**29**	**1,259**	**489**	**789**
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective		New Machines	451	451	—	444	—	—	—	444	135	309	—	—	—	—	7	—	—	7	—	—	—	—
		Net Improvements	136	410	(44)	524	(13)	37	(50)	537	587	157	(206)	93	13	79	(160)	(164)	6	(2)	(2)	(274)	(202)	(72)
	1985	**Annual Capacity**	**59,587**	**58,603**	**1,443**	**46,447**	**1,736**	**1,481**	**255**	**44,710**	**10,588**	**12,956**	**21,166**	**4,718**	**395**	**4,323**	**5,968**	**3,004**	**508**	**2,457**	**26**	**985**	**268**	**717**
		New Machines	335	335	—	248	—	—	—	248	231	18					87	—	—	87	—	—	—	—
		Net Improvements	647	666	(5)	468	11	11	—	457	244	262	(49)	35	1	35	168	44	5	118	—	(18)	(18)	—
	1986	**Annual Capacity**	**60,570**	**59,604**	**1,438**	**47,164**	**1,747**	**1,492**	**255**	**45,416**	**11,063**	**13,236**	**21,117**	**4,753**	**395**	**4,358**	**6,223**	**3,047**	**513**	**2,662**	**26**	**966**	**249**	**717**
		New Machines	295	295	—	152	—	—	—	152	49	103					144	3	—	141	—	—	—	—
		Net Improvements	458	458	—	393	—	—	—	392	303	133	(44)	27	—	27	39	(41)	—	80	—	—	—	—
	1987	**Annual Capacity**	**61,323**	**60,357**	**1,437**	**47,708**	**1,748**	**1,493**	**255**	**45,960**	**11,414**	**13,472**	**21,074**	**4,780**	**395**	**4,385**	**6,405**	**3,010**	**513**	**2,882**	**26**	**966**	**249**	**717**
		New Machines	144	144	—	99	—	—	—	99	43	56					45	44	—	2	—	—	—	—
		Net Improvements	232	232	(6)	305	8	8	—	298	141	89	67	12	—	12	(81)	(100)	—	20	—	—	—	—
	1988*	**Annual Capacity**	**61,699**	**60,733**	**1,432**	**48,112**	**1,756**	**1,501**	**255**	**46,356**	**11,598**	**13,617**	**21,141**	**4,792**	**395**	**4,397**	**6,370**	**2,954**	**513**	**2,904**	**26**	**966**	**249**	**717**
YEAR END CAPACITY 1984-1988	**1984**	**Year End Capacity**	**59,654**	**58,468**	**1,446**	**46,239**	**1,732**	**1,477**	**255**	**44,507**	**10,247**	**12,793**	**21,467**	**4,717**	**388**	**4,329**	**6,039**	**3,057**	**506**	**2,476**	**26**	**1,186**	**489**	**717**
		New Machines	207	207	—	207	—	—	—	207	207	—	—	—	—	—	—	—	—	—	—	—	—	—
		Net Improvements	37	256	(3)	357	11	11	—	346	464	336	(454)	7	7	—	(105)	(70)	7	(41)	—	(220)	(220)	—
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	1985	**Year End Capacity**	**59,897**	**58,931**	**1,443**	**46,802**	**1,742**	**1,487**	**255**	**45,060**	**10,918**	**13,129**	**21,013**	**4,725**	**395**	**4,330**	**5,935**	**2,987**	**513**	**2,435**	**26**	**966**	**249**	**717**
		New Machines	356	356	—	129	—	—	—	129	76	54					226	—	—	226	—	—	—	—
		Net Improvements	583	583	(6)	265	6	6	—	259	169	106	(16)	36	—	36	288	74	—	213	—	—	—	—
	1986	**Year End Capacity**	**60,836**	**59,869**	**1,437**	**47,197**	**1,748**	**1,493**	**255**	**45,449**	**11,162**	**13,289**	**20,998**	**4,761**	**395**	**4,366**	**6,448**	**3,061**	**513**	**2,874**	**26**	**966**	**249**	**717**
		New Machines	222	222	—	194	—	—	—	194	72	122					28	25	—	3	—	—	—	—
		Net Improvements	448	448	—	541	—	—	—	541	303	131	107	26	—	26	(119)	(145)	—	26	—	—	—	—
	1987	**Year End Capacity**	**61,506**	**60,540**	**1,437**	**47,932**	**1,748**	**1,493**	**255**	**46,184**	**11,537**	**13,542**	**21,105**	**4,787**	**395**	**4,392**	**6,357**	**2,94***	**513**	**2,903**	**26**	**966**	**249**	**717**
		New Machines	167	167	—	—	—	—	—	—	—	—					167	167	—	—	—	—	—	—
		Net Improvements	140	140	(6)	212	9	9	—	204	73	85	46	6	—	6	(72)	(57)	—	(15)	—	—	—	—
	1988*	**Year End Capacity**	**61,813**	**60,846**	**1,431**	**48,144**	**1,756**	**1,501**	**255**	**46,388**	**11,610**	**13,627**	**21,151**	**4,793**	**395**	**4,397**	**6,452**	**3,050**	**513**	**2,889**	**26**	**966**	**249**	**717**
YEAR END DAILY RATE 1984-1988	**1984**	Available Days	355	355	350	355	350	349	358	356	355	355	356	354	356	354	359	357	360	360	357	335	345	329
		Daily Rate	**168.03**	**164.50**	**4.13**	**130.14**	**4.94**	**4.23**	**.71**	**125.20**	**28.87**	**36.03**	**60.30**	**13.31**	**1.09**	**12.22**	**16.84**	**8.56**	**1.41**	**6.88**	**.07**	**3.54**	**1.36**	**2.18**
	1985	Available Days	355	355	350	355	350	349	358	356	355	355	356	354	357	354	359	357	360	360	357	330	333	329
		Daily Rate	**168.71**	**165.78**	**4.12**	**131.71**	**4.98**	**4.26**	**.71**	**126.74**	**30.76**	**36.97**	**59.01**	**13.33**	**1.11**	**12.22**	**16.55**	**8.36**	**1.43**	**6.76**	**.07**	**2.93**	**.75**	**2.18**
	1986	Available Days	355	356	350	355	350	349	358	356	355	355	356	354	357	354	359	357	360	359	357	330	333	329
		Daily Rate	**171.33**	**168.41**	**4.11**	**132.81**	**4.99**	**4.28**	**.71**	**127.82**	**31.43**	**37.42**	**58.96**	**13.43**	**1.11**	**12.32**	**17.99**	**8.56**	**1.43**	**8.00**	**.07**	**2.93**	**.75**	**2.18**
	1987	Available Days	355	355	350	355	350	349	358	356	355	355	356	354	357	354	358	357	360	359	357	330	333	329
		Daily Rate	**173.23**	**170.30**	**4.11**	**134.88**	**4.99**	**4.28**	**.71**	**129.89**	**32.49**	**38.14**	**59.26**	**13.51**	**1.11**	**12.40**	**17.74**	**8.23**	**1.43**	**8.08**	**.07**	**2.93**	**.75**	**2.18**
	1988*	Available Days	355	355	350	355	350	349	358	356	355	355	356	354	357	354	358	357	360	359	357	330	333	329
		Daily Rate	**174.09**	**171.17**	**4.09**	**135.48**	**5.02**	**4.30**	**.71**	**130.46**	**32.70**	**38.38**	**59.39**	**13.52**	**1.11**	**12.41**	**18.00**	**8.54**	**1.43**	**8.04**	**.07**	**2.93**	**.75**	**2.18**

*Capacity additions presented here for 1988 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board. Totals not adjusted for rounding differences.

ANNUAL CAPACITY/REGIONAL DISTRIBUTION

paper & paperboard

TOTAL U.S. CAPACITY		GRADES	NEW ENGLAND		MID-ATLANTIC	
1984	1988	*Practical Maximum Basis/Thousands short tons*	1984	1988	1984	1988
75,943	**81,125**	**TOTAL ALL GRADES PAPER & PAPERBOARD**	**6,103**	**6,498**	**5,909**	**5,887**
73,098	**78,768**	**TOTAL PAPER & PAPERBOARD**	6,039	6,440	5,309	5,413
37,106	**40,069**	**TOTAL PAPER**	**5,198**	**5,579**	**3,878**	**3,984**
5,851	5,873	NEWSPRINT	N.A.	N.A.	N.A.	N.A.
19,890	22,935	PRINTING, WRITING & RELATED	3,883	4,127	2,401	2,495
1,704	1,634	Uncoated Groundwood	766	758	N.A.	N.A.
3,766	4,534	Coated Groundwood	1,318	1,372	270	270
2,791	3,300	Coated Free Sheet	386	627	142	149
10,577	12,391	Uncoated Free Sheet[1]	1,406	1,365	1,809	1,893
1,051	1,075	Solid Bleached Bristols	6	5	19	21
6,088	5,643	PACKAGING & INDUSTRIAL CONVERTING	466	584	236	239
5,276	5,619	TISSUE	532	533	1,033	1,037
35,992	**38,699**	**TOTAL PAPERBOARD**	**841**	**861**	**1,430**	**1,429**
17,834	18,954	UNBLEACHED KRAFT	—	—	—	—
16,565	17,596	of which Kraft Linerboard	—	—	—	—
4,185	4,792	SOLID BLEACHED	N.A.	N.A.	—	—
5,252	5,636	SEMICHEMICAL	N.A.	N.A.	—	—
8,722	9,317	RECYCLED	711	733	1,430	1,429
2,845	**2,357**	**TOTAL CONSTRUCTION PAPER & BOARD**	**64**	**58**	**600**	**474**

E. NO. CENTRAL		W. NO. CENTRAL		SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC*	
1984	1988	1984	1988	1984	1988	1984	1988	1984	1988	1984	1988
12,101	**12,869**	**1,918**	**1,739**	**18,113**	**19,637**	**10,162**	**10,803**	**10,738**	**12,183**	**10,898**	**11,508**
11,794	12,558	1,515	1,573	17,593	19,117	9,759	10,401	10,362	11,869	10,727	11,397
7,240	**7,724**	**1,032**	**1,088**	**5,844**	**6,439**	**4,217**	**4,376**	**4,491**	**5,326**	**5,204**	**5,552**
N.A.	N.A.	—	—	979	1,046	1,154	1,085	1,188	1,151	1,861	1,865
4,891	5,288	1,015	1,070	2,456	3,138	1,989	2,474	1,592	2,342	1,662	2,001
285	248	N.A.	N.A.	N.A.	N.A.	142	125	N.A.	N.A.	189	186
1,130	1,410	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	90	109
986	1,002	N.A.	N.A.	N.A.	N.A.	354	363	N.A.	N.A.	142	137
2,371	2,506	242	240	1,473	1,885	1,245	1,740	860	1,262	1,171	1,500
118	123	—	—	396	435	N.A.	N.A.	369	350	70	69
840	864	N.A.	N.A.	1,971	1,675	495	173	1,259	1,291	805	797
1,366	1,393	—	—	438	579	579	644	452	543	876	889
4,553	**4,834**	**483**	**485**	**11,749**	**12,678**	**5,542**	**6,025**	**5,871**	**6,542**	**5,523**	**5,844**
—	—	—	—	7,793	8,133	3,465	3,855	3,566	3,880	3,011	3,086
—	—	—	—	7,362	7,704	3,048	3,435	3,190	3,414	2,965	3,042
N.A.	N.A.	—	—	1,711	2,015	750	804	1,249	1,490	444	455
1,632	1,813	N.A.	N.A.	1,056	1,141	941	970	686	778	768	762
2,920	3,019	416	415	1,189	1,389	385	396	370	395	1,300	1,541
308	**311**	**403**	**166**	**521**	**520**	**402**	**402**	**376**	**315**	**171**	**111**

wood pulp

59,001	**61,699**	**TOTAL ALL GRADES WOOD PULP**	**3,425**	**3,494**	**1,457**	**1,382**	**3,531**	**4,083**	**899**	**704**	**18,592**	**19,523**	**10,597**	**11,471**	**10,491**	**10,777**	**10,009**	**10,264**
57,742	**60,733**	**TOTAL WOOD PULP (exc. pulp for Construction Paper & Board)**	**3,346**	**3,415**	**1,362**	**1,364**	**3,402**	**3,952**	**621**	**646**	**18,335**	**19,266**	**10,364**	**11,238**	**10,376**	**10,661**	**9,934**	**10,190**
1,487	1,432	DISSOLVING	—	—	—	—	—	—	—	—	580	558	N.A.	N.A.	—	—	669	657
1,750	1,756	SULFITE PAPER GRADES	N.A.	N.A.	N.A.	N.A.	475	469	—	—	—	—	—	—	—	—	775	790
43,758	46,382	SULFATE & SODA PAPER GRADES	2,007	2,035	497	500	1,169	1,558	319	320	16,100	17,000	8,426	9,232	8,686	8,939	6,554	6,798
12,490	13,617	Bleached & Semibleached Softwood	699	698	152	146	303	332	N.A.	N.A.	4,018	4,728	2,133	2,538	2,302	2,238	2,797	2,852
9,867	11,598	Bleached & Semibleached Hardwood	1,273	1,299	345	355	636	994	N.A.	N.A.	2,875	3,416	2,579	3,004	1,791	2,145	147	164
21,401	21,167	Unbleached[2]	N.A.	N.A.	—	—	N.A.	N.A.	N.A.	N.A.	9,207	8,856	3,714	3,689	4,593	4,556	3,610	3,782
4,625	4,792	SEMICHEMICAL	N.A.	N.A.	431	434	1,350	1,405	N.A.	N.A.	835	857	787	810	531	613	567	547
6,122	6,370	MECHANICAL	1,005	1,045	189	188	409	520	258	280	821	851	913	979	1,159	1,109	1,369	1,398
1,259	**966**	**WOOD PULP FOR CONSTRUCTION PAPER & BOARD[3]**	**79**	**79**	**95**	**18**	**128**	**131**	**278**	**59**	**256**	**257**	**233**	**233**	**115**	**116**	**75**	**74**

(1) Includes cotton fiber and thin papers.
(2) Includes screenings.
(3) Excludes defibrated/exploded pulp capacity of mills that produce hard pressed board.

N.A.—Not Available.

Totals not adjusted for rounding differences.

**Includes Alaska*

WORLD CAPACITY

wood pulp (Except Defibrated/Exploded & Screenings)

Thousands of METRIC tons

	TOTALS		Percent Increase	MECHANICAL		SEMICHEMICAL		CHEMICAL PAPER GRADES		of which
	1984	1988		1984	1988	1984	1988	1984	1988	1984
WORLD TOTAL	**153,680**	**163,582**	**6.4**	36,009	38,869	9,599	10,072	101,993	108,620	28,353
DEVELOPED MARKET ECONOMIES	**124,779**	**132,712**	**6.4**	30,698	33,179	7,745	7,973	82,778	88,135	22,794
NORTH AMERICA	**75,673**	**79,363**	**4.9**	15,367	16,287	4,668	4,824	54,068	56,743	12,659
U.S.	**52,384**	**55,096**	**5.2**	5,554	5,779	4,196	4,347	41,285	43,671	5,470
Canada	**23,289**	**24,267**	**4.2**	9,813	10,508	472	477	12,783	13,072	7,189
JAPAN	**12,515**	**13,060**	**4.4**	2,556	2,651	1,336	1,307	8,174	8,653	983
WESTERN EUROPE	**32,453**	**35,434**	**9.2**	11,324	12,742	1,165	1,261	18,910	20,464	8,611
E.E.C.	**6,106**	**6,973**	**14.2**	2,960	3,453	387	423	2,561	2,896	922
Nordic countries	**20,890**	**22,580**	**8.1**	7,385	8,270	690	750	12,260	13,095	5,585
Rest of Western Europe	**5,457**	**5,881**	**7.8**	979	1,019	88	88	4,089	4,473	2,104
OCEANIA	**2,630**	**2,742**	**4.3**	1,076	1,124	411	416	1,143	1,202	471
OTHERS	**1,508**	**2,113**	**40.1**	375	375	165	165	483	1,073	70
DEVELOPING MARKET ECONOMIES	**9,008**	**10,822**	**20.1**	1,501	1,806	587	774	6,648	7,895	2,921
AFRICA	**777**	**818**	**5.3**	37	48	41	41	699	729	500
LATIN AMERICA	**6,039**	**7,351**	**21.7**	756	964	363	398	4,843	5,912	2,200
of which: Brazil	**3,584**	**4,335**	**21.0**	344	487	124	124	3,054	3,662	1,513
Mexico	**664**	**854**	**28.6**	115	180	—	—	549	674	—
ASIA	**2,192**	**2,653**	**21.0**	708	794	183	335	1,106	1,254	221
CENTRALLY PLANNED ECONOMIES	**19,893**	**20,048**	**0.8**	3,810	3,884	1,267	1,325	12,567	12,590	2,638
of which: USSR	**13,750**	**13,750**	—	2,500	2,500	850	850	8,700	8,700	2,000

Totals not adjusted for rounding differences.

**No data available for 1988.*

paper & paperboard (Except Insulating & Hard Pressed Board)

Thousands of METRIC tons

	DISSOLVING		TOTALS			NEWSPRINT		PRINTING & WRITING		WRAPPING		ALL OTHERS	
market 1987*	1984	1988	1984	1988	Percent Increase	1984	1988	1984	1988	1984	1988	1984	1988
29,567	6,079	6,021	**212,761**	**230,519**	**8.3**	31,238	33,586	54,915	63,019	101,863	107,940	24,745	25,974
23,667	3,558	3,425	**166,023**	**180,081**	**8.5**	26,471	27,983	45,046	52,046	75,360	79,980	19,146	20,072
13,269	1,570	1,509	**83,129**	**88,904**	**6.9**	15,128	15,428	19,785	23,002	39,361	41,365	8,855	9,109
5,784	1,349	1,299	**67,581**	**72,494**	**7.3**	5,308	5,328	17,738	20,507	36,164	38,055	8,371	8,604
7,485	221	210	**15,548**	**16,410**	**5.5**	9,820	10,100	2,047	2,495	3,197	3,310	484	505
983	449	449	**23,495**	**25,169**	**7.1**	2,829	3,143	6,112	7,003	10,569	10,854	3,985	4,169
8,738	1,054	967	**54,729**	**60,574**	**10.7**	7,393	8,091	18,451	21,287	22,938	24,769	5,947	6,427
1,020	198	201	**26,538**	**31,809**	**11.5**	1,973	2,441	10,553	12,147	12,309	13,232	3,703	3,989
5,445	555	465	**17,055**	**19,205**	**12.6**	4,590	4,690	5,135	6,205	6,110	6,900	1,220	1,410
2,273	301	301	**9,136**	**9,560**	**4.6**	830	960	2,763	2,935	4,519	4,637	1,024	1,028
492	—	—	**2,894**	**3,160**	**9.2**	695	875	341	397	1,644	1,672	214	216
185	485	500	**1,776**	**2,274**	**28.0**	426	446	357	357	848	1,320	145	151
3,279	272	347	**20,151**	**23,267**	**15.5**	1,919	2,687	4,956	5,816	11,056	12,391	2,220	2,373
500	—	—	**1,020**	**1,145**	**12.3**	19	28	254	333	686	721	61	63
2,529	77	77	**11,183**	**12,897**	**15.3**	948	1,266	2,468	2,858	6,089	7,002	1,678	1,771
1,695	62	62	**3,096**	**3,665**	**18.4**	305	415	587	647	1,684	2,045	510	558
—	—	—	**4,228**	**4,950**	**17.1**	127	299	1,132	1,346	2,423	2,750	546	555
250	195	270	**7,948**	**9,225**	**16.1**	952	1,393	2,234	2,625	4,281	4,668	481	539
2,621	2,249	2,249	**26,587**	**27,171**	**2.2**	2,848	2,916	4,913	5,157	15,447	15,569	3,379	3,529
2,000	1,700	1,700	**14,000**	**14,000**	--	1,950	1,950	1,700	1,700	9,465	9,465	885	885

Source: Food and Agriculture Organization of the United Nations; U.S. capacity-American Paper Institute

STRUCTURE OF U.S. PAPER, PAPERBOARD, WOOD PULP INDUSTRY—1984

mill size

ANNUAL CAPACITY RANGE (Thousands short tons)	PAPER & PAPERBOARD		WOOD PULP	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL	**571**	**100%**	**225**	**100%**
0-25	156	3	19	1
26-50	97	5	15	1
51-75	66	5	19	2
76-100	47	6	16	2
101-125	30	5	13	2
126-150	24	4	7	2
151-175	15	3	14	4
176-200	22	6	11	4
201-250	23	7	15	6
251-300	13	5	16	8
301-350	12	5	11	6
351-400	16	8	15	10
401-450	11	6	10	7
451-500	13	8	14	11
over 500	26	24	30	34

Capacities measured on a practical maximum basis

capacity in integrated & non integrated paper & paperboard mills

Thousands short tons

GRADES	ANNUAL CAPACITY		
	INTEGRATED TO WOOD PULP	NOT INTEGRATED TO WOOD PULP	TOTAL
TOTAL	**57,202**	**18,741**	**75,943**
PAPER	**27,827**	**9,279**	**37,106**
Newsprint	5,369	482	5,851
Uncoated Groundwood	1,360	344	1,704
Coated Groundwood	3,608	158	3,766
Coated Free Sheet	2,044	747	2,791
Uncoated Free Sheet*	7,456	2,783	10,239
Thin Papers	83	255	338
Solid Bleached Bristols	958	93	1,051
Pkg. & Ind. Conv.	4,795	1,293	6,088
Tissue	2,153	3,123	5,276
PAPERBOARD	**27,587**	**8,405**	**35,992**
Unbleached Kraft	17,834	—	17,834
Solid Bleached	4,183	2	4,185
Semichemical	5,252	—	5,252
Recycled	318	8,403	8,722
CONSTRUCTION PAPER & BOARD	**1,788**	**1,057**	**2,845**

**Includes cotton fiber*

Totals not adjusted for rounding differences

Integrated mills include all mills with active on-site wood pulp capacity, whether or not this capacity provides a significant portion of total furnish.

integrated paper & paperboard mills

The degree of integration to wood pulp for each mill was calculated by dividing on-site wood pulp capacity by paper & paperboard capacity.

DEGREE OF INTEGRATION TO WOOD PULP	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL		W. NO. CENTRAL	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL REGION	**85**	**100%**	**107**	**100%**	**134**	**100%**	**17**	**100%**
100% or more	8	19	3	6	1	1	1	6
80% to 99%	1	9	1	1	5	9	1	13
60% to 79%	4	19	3	9	11	16	5	20
40% to 59%	1	3	7	18	10	12	2	27
20% to 39%	2	8	2	4	4	6	—	—
01% to 19%	—	—	—	—	1	1	—	—
Not integrated	69	42	91	62	102	55	8	34

DEGREE OF INTEGRATION TO WOOD PULP	SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL REGION	**74**	**100%**	**43**	**100%**	**43**	**100%**	**68**	**100%**
100% or more	19	41	14	47	14	49	15	42
80% to 99%	16	38	6	30	8	32	6	20
60% to 79%	4	8	5	8	2	8	5	14
40% to 59%	2	1	2	4	1	2	1	1
20% to 39%	2	2	—	—	3	1	—	—
01% to 19%	1	1	1	4	1	1	3	3
Not integrated	30	9	15	7	14	7	38	20

All data based on machines in place January 1984

machines in operation 1984

size of machines—by principal grade produced

Machine Annual Capacity (Thousands short tons)	Paper: Newsprint Number of Machines	Paper: Newsprint Share of Total Capacity	Paper: Printing & Writing Number of Machines	Paper: Printing & Writing Share of Total Capacity	Paper: Packaging & Ind. Conv. Number of Machines	Paper: Packaging & Ind. Conv. Share of Total Capacity	Paper: Tissue Number of Machines	Paper: Tissue Share of Total Capacity
Total	45	100%	438	100%	185	100%	215	100%
0-5	—	—	52	1	44	2	27	2
6-10	—	—	43	2	36	5	32	5
11-15	—	—	27	2	26	6	27	7
16-20	—	—	37	4	15	5	22	8
21-30	—	—	62	8	21	9	30	14
31-40	3	2	49	9	6	4	39	26
41-50	1	1	37	9	4	3	21	18
51-75	6	6	54	18	7	8	14	15
76-100	2	3	30	14	7	11	3	5
101-125	9	18	17	10	8	15	—	—
126-150	10	23	16	11	4	9	—	—
151-200	9	27	13	11	5	14	—	—
201-250	5	20	1	1	1	4	—	—
251-300	—	—	—	—	1	5	—	—

Machine Annual Capacity (Thousands short tons)	Paperboard: Unbleached Kraft Number of Machines	Paperboard: Unbleached Kraft Share of Total Capacity	Paperboard: Solid Bleached Number of Machines	Paperboard: Solid Bleached Share of Total Capacity	Paperboard: Semichemical Number of Machines	Paperboard: Semichemical Share of Total Capacity	Paperboard: Recycled Number of Machines	Paperboard: Recycled Share of Total Capacity	Construction Grades: Construction Number of Machines	Construction Grades: Construction Share of Total Capacity
Total	69	100%	27	100%	40	100%	193	100%	98	100%
0-5	—	—	—	—	—	—	1	—	18	1
6-10	—	—	—	—	—	—	3	1	18	5
11-15	—	—	—	—	—	—	20	3	11	5
16-20	—	—	1	—	—	—	12	3	4	2
21-30	—	—	—	—	1	1	37	11	10	9
31-40	—	—	—	—	—	—	30	12	11	14
41-50	1	—	1	1	2	2	30	16	7	11
51-75	—	—	2	3	4	5	38	27	7	15
76-100	2	1	1	2	7	12	14	14	10	30
101-125	2	1	—	—	10	21	4	5	2	8
126-150	6	5	1	3	5	13	2	3	—	—
151-200	10	10	16	61	6	21	2	5	—	—
201-250	15	19	4	21	3	13	—	—	—	—
251-300	7	11	—	—	1	6	—	—	—	—
301-400	20	38	1	9	1	6	—	—	—	—
over 400	6	15	—	—	—	—	—	—	—	—

All data based on machines in place January 1984

age of machines—by principal grade produced

Year Machine Installed Or Rebuilt*	Paper: Newsprint Number of Machines	Paper: Newsprint Share of Total Capacity	Paper: Printing & Writing Number of Machines	Paper: Printing & Writing Share of Total Capacity	Paper: Packaging & Ind Conv. Number of Machines	Paper: Packaging & Ind Conv. Share of Total Capacity	Paper: Tissue Number of Machines	Paper: Tissue Share of Total Capacity
Total	45		438		185		215	
No Data Available	3		79		25		53	
Total Sample	42	100%	359	100%	160	100%	162	100%
1983	1	4	10	3	5	3	4	2
1982	1	2	22	7	10	12	3	2
1981	4	12	18	7	7	12	6	4
1980	1	3	20	8	6	2	5	5
1979	6	18	10	3	2	1	5	6
1978	—	—	13	3	2	1	7	6
1977	1	1	15	5	5	5	5	4
1976	1	3	17	6	5	3	10	4
1971-1975	7	16	47	15	26	15	19	12
1966-1970	8	20	70	20	34	22	37	26
1961-1965	1	1	56	13	16	3	34	21
1956-1960	4	9	24	5	7	1	9	3
1951-1955	5	10	15	2	9	8	1	1
Prior to 1950	2	1	22	3	26	12	17	4

Year Machine Installed Or Rebuilt*	Paperboard: Unbleached Kraft Number of Machines	Paperboard: Unbleached Kraft Share of Total Capacity	Paperboard: Solid Bleached Number of Machines	Paperboard: Solid Bleached Share of Total Capacity	Paperboard: Semichemical Number of Machines	Paperboard: Semichemical Share of Total Capacity	Paperboard: Recycled Number of Machines	Paperboard: Recycled Share of Total Capacity	Construction Grades: Construction Number of Machines	Construction Grades: Construction Share of Total Capacity
Total	69		27		40		193		98	
No Data Available	—		—		—		47		54	
Total Sample	69	100%	27	100%	40	100%	146	100%	44	100%
1983	2	2	—	—	—	—	3	2	1	5
1982	6	8	2	6	3	9	7	5	—	—
1981	5	7	—	—	2	7	11	8	—	—
1980	8	10	—	—	1	2	6	4	—	—
1979	5	5	3	13	2	3	5	5	—	—
1978	4	7	1	4	5	15	2	1	1	—
1977	2	3	1	4	1	3	6	6	2	6
1976	1	2	1	5	1	1	3	2	4	4
1971-1975	9	15	5	20	13	36	32	25	15	43
1966-1970	9	17	4	22	7	15	20	13	4	5
1961-1965	8	11	3	11	2	5	11	6	5	8
1956-1960	4	5	5	11	2	3	5	4	4	12
1951-1955	3	4	1	4	1	1	11	6	1	1
Prior to 1950	3	4	1	—	—	—	24	13	7	16

All data based on machines in place January 1984

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

age of machines—by geographic region

Year Machine Installed Or Rebuilt*	Total U.S. Number of Machines	Total U.S. Share of Total Capacity	New England Number of Machines	New England Share of Total Capacity	Mid-Atlantic Number of Machines	Mid-Atlantic Share of Total Capacity	E. No. Central Number of Machines	E. No. Central Share of Total Capacity
Total	1310		238		220		326	
No Data Available	261		62		69		52	
Total Sample	1049	100%	176	100%	151	100%	274	100%
1983	26	2	3	—	5	3	6	2
1982	54	7	15	10	6	3	13	8
1981	53	7	2	3	7	6	15	7
1980	47	6	10	7	5	4	11	6
1979	39	5	5	3	5	3	7	5
1978	35	4	5	4	4	1	8	5
1977	38	4	10	7	1	—	9	5
1976	43	3	7	5	4	2	13	3
1971-1973	173	19	23	18	29	24	45	20
1966-1970	193	19	33	18	34	24	54	18
1961-1965	136	10	27	11	21	14	30	7
1956-1960	64	5	6	2	13	8	16	3
1951-1955	47	4	9	7	2	2	14	3
Prior to 1950	102	5	21	5	15	6	33	8

Year Machine Installed Or Rebuilt*	W. No. Central Number of Machines	W. No. Central Share of Total Capacity	South Atlantic Number of Machines	South Atlantic Share of Total Capacity	E. So. Central Number of Machines	E. So. Central Share of Total Capacity	W. So. Central Number of Machines	W. So. Central Share of Total Capacity	Mountain & Pacific Number of Machines	Mountain & Pacific Share of Total Capacity
Total	35		161		84		96		150	
No Data Available	4		32		13		11		18	
Total Sample	31	100%	129	100%	71	100%	85	100%	132	100%
1983	3	9	5	4	2	4	—	—	2	2
1982	1	8	6	4	4	10	4	7	5	6
1981	1	2	11	8	3	3	5	10	9	8
1980	2	4	6	5	5	10	1	2	7	9
1979	—	—	9	11	2	3	3	4	7	5
1978	1	3	8	9	1	1	3	3	5	3
1977	—	—	4	3	2	5	4	5	8	6
1976	2	5	4	4	3	2	4	2	6	4
1971-1975	6	25	26	16	14	17	15	20	15	17
1966-1970	4	14	18	14	11	23	20	27	19	12
1961-1965	7	16	10	6	9	8	9	10	23	15
1956-1960	1	4	9	6	7	8	5	4	7	5
1951-1955	2	6	7	5	2	3	4	2	7	5
Prior to 1950	1	4	6	5	6	3	8	4	12	3

All data based on machines in place January 1984

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

FIBER SOURCES

for paper/paperboard/wood pulp manufacture

fiber consumption in paper & paperboard manufacture

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific
1984										
TOTAL FIBER	**72,421**	**100.0**	**5,368**	**5,061**	**11,106**	**1,459**	**18,196**	**9,960**	**10,584**	**10,688**
TOTAL WOOD PULP	55,174	76.2	4,111	2,784	6,044	913	15,215	8,763	9,231	8,093
Manufactured on-site	46,199	63.8	2,398	1,137	2,844	613	14,643	8,397	9,008	7,159
*Purchased & transferred	8,974	12.4	1,713	1,647	3,200	299	571	386	224	933
†TOTAL RECYCLABLE PAPER	16,983	23.3	1,171	2,245	4,999	526	2,902	1,154	1,304	2,582
Mixed Papers	1,975	2.7	160	367	515	106	382	165	123	157
Newspapers	2,895	4.0	131	623	729	55	433	40	98	786
Corrugated	7,972	11.0	317	630	2,337	300	1,634	766	655	1,333
Pulp Substitutes	2,673	3.7	418	397	688	43	446	166	262	253
High Grade Deinking	1,369	1.9	144	228	730	24	7	17	166	53
OTHER FIBERS	365	0.5	86	32	63	20	80	23	48	13
1985										
TOTAL FIBER	**72,220**	**100.0**	**5,384**	**5,072**	**11,221**	**1,494**	**17,807**	**9,903**	**10,673**	**10,666**
TOTAL WOOD PULP	54,638	75.7	4,060	2,772	6,133	924	14,887	8,729	9,276	7,856
Manufactured on-site	45,527	63.0	2,311	1,165	2,817	620	14,322	8,328	9,041	6,924
*Purchased & transferred	9,111	12.6	1,749	1,607	3,316	304	566	401	236	933
†TOTAL RECYCLABLE PAPER	17,231	23.8	1,247	2,271	5,025	550	2,839	1,151	1,349	2,799
Mixed Papers	2,026	2.8	174	376	548	108	383	162	124	151
Newspapers	2,975	4.1	149	624	711	57	433	39	107	856
Corrugated	8,166	11.3	339	644	2,307	317	1,647	786	649	1,476
Pulp Substitutes	2,681	3.7	456	420	705	44	361	164	280	251
High Grade Deinking	1,382	1.9	130	208	753	24	15	—	189	65
OTHER FIBERS	351	0.5	77	29	63	20	80	23	48	11
1986										
TOTAL FIBER	**77,043**	**100.0**	**5,806**	**5,204**	**11,638**	**1,501**	**19,093**	**10,494**	**11,661**	**11,446**
TOTAL WOOD PULP	58,178	75.5	4,376	2,831	6,353	930	16,005	9,252	10,101	8,330
Manufactured on-site	48,651	63.1	2,532	1,169	2,981	624	15,276	8,848	9,841	7,380
*Purchased & transferred	9,527	12.4	1,844	1,662	3,371	306	728	404	260	950
†TOTAL RECYCLABLE PAPER	18,487	24.0	1,338	2,343	5,419	551	3,003	1,216	1,511	3,106
Mixed Papers	2,112	2.7	179	393	571	109	396	169	125	171
Newspapers	3,149	4.1	161	647	790	57	432	42	120	900
Corrugated	8,867	11.5	351	656	2,511	317	1,763	834	724	1,712
Pulp Substitutes	2,820	3.7	487	440	755	45	374	170	297	252
High Grade Deinking	1,538	2.0	160	208	792	24	38	1	246	70
OTHER FIBERS	379	0.5	93	30	67	20	86	25	48	11
1987										
TOTAL FIBER	**79,420**	**100.0**	**6,015**	**5,317**	**12,200**	**1,511**	**19,792**	**10,783**	**12,253**	**11,548**
TOTAL WOOD PULP	59,758	75.3	4,485	2,870	6,568	934	16,454	9,469	10,567	8,410
Manufactured on-site	50,214	63.3	2,620	1,187	3,103	621	15,837	9,052	10,351	7,442
*Purchased & transferred	9,544	12.0	1,865	1,683	3,465	313	618	417	216	968
†TOTAL RECYCLABLE PAPER	19,245	24.2	1,425	2,413	5,563	557	3,250	1,277	1,634	3,127
Mixed Papers	2,182	2.7	187	403	591	110	411	174	133	172
Newspapers	3,219	4.1	173	660	812	58	445	46	123	903
Corrugated	9,268	11.7	369	683	2,562	320	1,944	847	821	1,722
Pulp Substitutes	2,958	3.7	533	456	788	45	393	186	299	259
High Grade Deinking	1,618	2.0	162	212	810	24	57	24	259	71
OTHER FIBERS	416	0.5	105	33	69	20	88	37	52	11

Comprises all dried, wet lap or slush pulp not produced on-site including transfers from company owned or affiliated mills.
†Includes construction grades and molded pulp products.

fiber consumption in paper & paperboard manufacture (continued)

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific
1988										
TOTAL FIBER	**80,651**	**100.0**	**6,189**	**5,368**	**12,361**	**1,538**	**20,053**	**11,022**	**12,465**	**11,655**
TOTAL WOOD PULP	60,595	75.2	4,615	2,889	6,663	960	16,576	9,668	10,740	8,483
Manufactured on-site	50,865	63.1	2,700	1,189	3,140	635	15,947	9,251	10,525	7,478
*Purchased & transferred	9,729	12.1	1,914	1,700	3,523	325	629	417	215	1,005
†TOTAL RECYCLABLE PAPER	19,625	24.3	1,468	2,445	5,629	558	3,388	1,303	1,674	3,160
Mixed Papers	2,199	2.7	189	408	598	110	413	175	134	173
Newspapers	3,243	4.0	175	667	814	58	456	46	123	904
Corrugated	9,438	11.7	383	694	2,589	320	2,028	842	857	1,724
Pulp Substitutes	3,053	3.8	559	458	812	45	405	214	300	261
High Grade Deinking	1,692	2.1	162	219	816	24	87	26	259	99
OTHER FIBERS	431	0.5	106	34	69	20	88	51	52	11

Totals not adjusted for rounding differences

pulpwood consumption in wood pulp manufacture

Thousands of CORDS

1984										
TOTAL PULPWOOD	**85,016**	**100.0**	**5,224**	**1,952**	**4,745**	**1,104**	**26,722**	**15,297**	**14,834**	**15,140**
Roundwood & Roundwood Chips	50,460	59.4	4,033	1,570	3,450	911	18,141	10,758	9,313	2,284
Forest Residues	3,936	4.6	—	71	456	158	1,216	498	1,011	526
Manufacturing Residues	30,620	36.0	1,191	312	839	35	7,364	4,041	4,500	12,339
1985										
TOTAL PULPWOOD	**84,955**	**100.0**	**5,311**	**2,044**	**4,761**	**990**	**26,611**	**15,705**	**14,425**	**15,109**
Roundwood & Roundwood Chips	50,282	59.2	4,022	1,673	3,447	898	17,989	11,212	8,876	2,165
Forest Residues	4,019	4.7	—	57	468	52	1,292	556	1,051	543
Manufacturing Residues	30,654	36.1	1,290	315	846	40	7,330	3,936	4,497	12,401
1986										
TOTAL PULPWOOD	**90,018**	**100.0**	**5,526**	**2,092**	**5,480**	**992**	**28,184**	**16,467**	**15,382**	**16,896**
Roundwood & Roundwood Chips	53,457	59.4	4,132	1,720	4,026	898	19,015	11,736	9,620	2,310
Forest Residues	4,336	4.8	—	57	548	54	1,379	603	1,106	590
Manufacturing Residues	32,225	35.8	1,395	315	905	40	7,790	4,128	4,657	12,995
1987										
TOTAL PULPWOOD	**91,878**	**100.0**	**5,547**	**2,150**	**5,622**	**985**	**28,852**	**16,919**	**15,657**	**16,144**
Roundwood & Roundwood Chips	54,717	59.5	4,136	1,775	4,153	891	19,472	12,069	9,838	2,383
Forest Residues	4,383	4.8	—	57	552	54	1,400	620	1,112	589
Manufacturing Residues	32,777	35.7	1,411	318	917	40	7,980	4,229	4,708	13,172
1988										
TOTAL PULPWOOD	**92,267**	**100.0**	**5,580**	**2,147**	**5,651**	**1,003**	**29,117**	**16,712**	**15,790**	**16,266**
Roundwood & Roundwood Chips	54,915	59.5	4,154	1,772	4,184	909	19,686	11,805	9,938	2,467
Forest Residues	4,375	4.7	—	57	552	54	1,392	620	1,112	588
Manufacturing Residues	32,977	35.8	1,426	318	915	40	8,039	4,287	4,740	13,211

Totals not adjusted for rounding differences

FIBER CONSUMPTION DEFINITIONS

1984—Actual consumption
1985—Best estimate based on year-to-date experience
1986-88—Consumption at capacity levels of production

RECYCLABLE PAPER CONSUMED IN PAPER & PAPERBOARD MANUFACTURE

actual consumption

Thousands short tons

END PRODUCTS	1984 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**16,883**	**1,975**	**2,895**	**7,972**	**2,673**	**1,369**
TOTAL PAPER	**4,708**	**76**	**1,433**	**259**	**1,731**	**1,210**
NEWSPRINT	1,269	—	1,258	—	12	—
PRINTING, WRITING & RELATED	1,194	—	—	13	852	329
PACKAGING & IND. CONVERTING	314	12	6	68	222	5
TISSUE	1,930	64	169	177	645	876
TOTAL PAPERBOARD	**12,175**	**1,899**	**1,462**	**7,713**	**942**	**159**
KRAFT, BLEACHED & UNBLEACHED	1,462	—	—	1,331	98	33
SEMICHEMICAL	1,580	1	—	1,576	2	—
RECYCLED	8,176	1,482	1,246	4,562	760	126
CONSTRUCTION PAPER & BOARD	**957**	**416**	**216**	**243**	**82**	**—**

Data on recyclable paper are collected in an industry-wide survey of paper and paperboard mills under the following definitions:
1984—Actual consumption.
1985—Best estimate based on year-to-date experience.
1986-1988—Consumption at capacity levels of production.

planned future consumption

Thousands short tons

END PRODUCTS	1985 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1986 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**17,231**	**2,026**	**2,975**	**8,166**	**2,681**	**1,382**	**18,487**	**2,112**	**3,149**	**8,867**	**2,820**	**1,538**
TOTAL PAPER	**4,806**	**96**	**1,510**	**270**	**1,699**	**1,231**	**5,118**	**102**	**1,582**	**288**	**1,790**	**1,356**
NEWSPRINT	1,325	—	1,323	—	2	—	1,373	—	1,371	—	2	—
PRINTING, WRITING & RELATED	1,095	—	—	13	764	318	1,155	—	—	13	806	336
PACKAGING & IND. CONVERTING	319	12	6	70	226	5	331	13	6	71	235	5
TISSUE	2,067	84	181	187	707	908	2,259	89	205	204	747	1,015
TOTAL PAPERBOARD	**12,425**	**1,930**	**1,464**	**7,897**	**983**	**150**	**13,369**	**2,010**	**1,567**	**8,579**	**1,030**	**183**
KRAFT, BLEACHED & UNBLEACHED	1,464	—	—	1,334	110	20	1,621	—	—	1,477	104	40
SEMICHEMICAL	1,570	1	—	1,566	2	—	1,711	—	—	1,709	2	—
RECYCLED	8,429	1,513	1,242	4,766	777	130	9,038	1,583	1,338	5,150	826	141
CONSTRUCTION PAPER & BOARD	**963**	**416**	**222**	**231**	**94**	**—**	**999**	**427**	**229**	**243**	**98**	**2**

END PRODUCTS	1987 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1988 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**19,245**	**2,182**	**3,219**	**9,268**	**2,958**	**1,618**	**19,625**	**2,199**	**3,243**	**9,438**	**3,053**	**1,692**
TOTAL PAPER	**5,289**	**104**	**1,604**	**296**	**1,883**	**1,401**	**5,424**	**104**	**1,614**	**303**	**1,932**	**1,472**
NEWSPRINT	1,388	—	1,386	—	2	—	1,389	—	1,387	—	2	—
PRINTING, WRITING & RELATED	1,203	—	—	13	838	351	1,262	—	—	13	866	383
PACKAGING & IND. CONVERTING	345	14	6	72	247	5	348	14	6	74	248	5
TISSUE	2,354	90	211	211	796	1,045	2,425	90	221	216	816	1,084
TOTAL PAPERBOARD	**13,956**	**2,078**	**1,615**	**8,971**	**1,074**	**217**	**14,201**	**2,095**	**1,628**	**9,136**	**1,121**	**221**
KRAFT, BLEACHED & UNBLEACHED	1,757	—	—	1,586	101	71	1,860	—	—	1,686	101	73
SEMICHEMICAL	1,737	—	—	1,734	2	—	1,753	—	—	1,751	2	—
RECYCLED	9,416	1,633	1,374	5,398	867	142	9,525	1,651	1,387	5,445	899	144
CONSTRUCTION PAPER & BOARD	**1,047**	**445**	**241**	**253**	**104**	**4**	**1,063**	**445**	**241**	**254**	**120**	**4**

Totals not adjusted for rounding differences.

Recyclable paper for molded pulp included under Construction Paper & Board as follows: 1984, 159,000 tons; 1985, 176,000 tons; 1986-88, 187,000 tons.

ANNOUNCED CAPACITY EXPANSION

new mills and machines

Expansion projects include new paper, paperboard and wood pulp mills and new paper and paperboard machines in existing mills. These projects have been publicly announced by the managements of the companies concerned and are included in the capacity estimates reported in this survey. Estimates also include confirmed expansion projects that have not been publicly announced which, in keeping with the confidential nature of the survey, are not included in this listing.

projects included in survey estimates

Thousands short tons

Grade	Annual Capacity	Proposed Start-up	Company & Location
Coated Groundwood	200	1986	Bowater Incorporated Catawba, SC
Coated Groundwood	180	1987	Consolidated Papers Incorporated Wisconsin Rapids, WI
Coated Groundwood	200*	1988	Blandin Paper Company Grand Rapids, MN
Coated Free Sheet	215	1986	Scott Paper Company Skowhegan, ME
Uncoated Free Sheet	160	1984	Crown Zellerbach Corporation Camas, WA
Uncoated Free Sheet	100	1985	Georgia-Pacific Corporation Crossett, AR
Uncoated Free Sheet	230	1986	Georgia-Pacific Corporation Port Hudson, LA
Uncoated Free Sheet	185	1987	Hammermill Paper Company Selma, AL
Uncoated Free Sheet	300-350	1985-1986	International Paper Company Mobile, AL
Uncoated Free Sheet/Cotton Fiber	30	1986	Kimberly-Clark Corporation Whiting, WI
Uncoated Free Sheet	215†	1984	Union Camp Corporation Eastover, SC
Tissue	16	1984	Cascades Paper Incorporated Rockingham, NC
Tissue	N.A.*	1984	Fort Howard Paper Company Green Bay, WI
Tissue	N.A.	1985	Fort Howard Paper Company Muskogee, OK
Tissue	N.A.†	1987 & 1988	Fort Howard Paper Company Rincon, GA
Tissue	70	1986	James River Corporation Naheola, AL
Unbleached Kraft Linerboard	315*	1986	Chesapeake Corporation West Point, VA
Solid Bleached Paperboard	250*	1986	Westvaco Corporation Covington, VA
Recycled Paperboard	175	1985	Temple-Inland Incorporated Ontario, CA
Wet Machine Board	3	1984	Lydall Incorporated Hoosick Falls, NY
Bleached Sulfate Pulp	265†	1985	Champion International Corporation Quinnesec, MI
Bleached Sulfate Pulp	365†	1984	Leaf River Forest Products Incorporated New Augusta, MS

*N.A.—Not Available. * Will replace existing capacity. † New mill*

Practical Maximum Capacity. Practical Maximum Capacity, as defined in this survey, is the tonnage of paper, paperboard or pulp of normal commercial quality that could be produced with full use of equipment and adequate supplies of raw materials and labor, and assuming full demand. No allowance is made for losses due to unscheduled shutdowns, strikes, temporary lack of power, etc., which cause decreases in actual production, but not in productive capacity. Capacity of paper machines which produce more than one grade is apportioned in accordance with actual production patterns or plans for future operation.

Capacity is reported in short tons of net finished paper and paperboard and air-dry (10% moisture content) pulp. Shrinkage of bleached or semibleached pulp is taken into account.

Annual practical maximum capacity—includes changes in capacity only for the portion of the year in which they are actually effective.

Year-end practical maximum capacity—assumes that all changes in capacity are in effect from the first day of the year in which they occur.

New Machines and Net Improvements: Capacity increases or decreases are shown in two main groups: New Machines and Net Improvements.

New Machines—are defined as machines purchased or to be purchased from equipment manufacturers. Consequently, capacity changes resulting from transfers of paper machines from one mill to another are shown under Net Improvements.

Net Improvements—are defined as net changes resulting from modernization of machines, dismantling old machines, shifts in grades, etc.

Capacity increases from new machines are shown under New Machines for the first two years of operation (including the year of installation). Any additional capacity realized in a third or subsequent year is shown under Net Improvements.

Market Pulp Capacity: Market pulp in this survey is defined as wood pulp produced in the U.S. for sale to pulp consumers. It excludes pulp for use or consumption by a producing mill or for shipment by a producing mill to other mills within its supply region which it owns, controls or with which it is affiliated. Shipments to owned mills outside the U.S. are defined as market pulp.

PAPER GRADES

Newsprint: Paper used chiefly in the printing of newspapers, made largely from mechanical pulp and weighing not less than 28½ pounds nor more than 35 pounds (24 × 36 – 500).

Uncoated Groundwood: Uncoated papers containing more than 10% groundwood or other mechanical pulps in their furnish, excluding newsprint.

Machine and Off Machine Coated: Bleached papers with a coating weight of at least 2½ pounds (25 × 38 – 500) on either side and at least 50% of the coating consisting of clay (Kaolin).

Coated Groundwood: Coated papers containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner) in their furnish.

Coated Free Sheet: Coated papers containing 10% or less mechanical pulp (mostly stone groundwood and/or refiner in their furnish).

Uncoated Free Sheet: Bleached uncoated printing and writing papers containing not more than 10% groundwood or other mechanical pulps in their furnish: i.e., offset, tablet, envelope, business papers (bond, ledger, mimeo, duplicator) form bond, cover and text and related papers.

Bleached Bristols: Includes tabulating index, tag and file folder, coated cover bristols, and uncoated bristols (index, printing, and postcard).

Cotton Fiber: Papers containing 25% or more in their furnish of cotton, cotton rags, cotton waste, linters, linter pulp, flax, or similar fibers.

Thin Papers: Includes carbonizing, condenser, cigarette, bible, and similar papers.

Packaging and Industrial Converting: Wrapping paper, shipping sack, bag and sack other than shipping sack, and other converting papers—18 pounds and over.

Unbleached Kraft: Paper containing more than 80% unbleached sulfate wood pulp. Wrapping paper, shipping sack, grocers sack and other bag, and other converting papers—18 lbs. and over (24 × 36 – 500).

Bleached Packaging and Industrial Converting: Paper made for similar end uses as unbleached kraft, but made from bleached, and semibleached sulfate and unbleached sulfite pulps. Wrapping paper, shipping sack, grocers and other bag and sack, and other converting papers—18 lbs. and over (24 × 36 – 500).

Specialty Packaging: Paper and board of all weights and furnishes, usually used as protective packaging for food and other consumer products, such as bakery bags, fast food and frozen food wraps. Also includes glassine, greaseproof and vegetable parchment paper.

Special Industrial: Paper and board, of all weights, calipers and furnishes, designed for specialized end uses and manufactured to exact customer specifications; includes abrasive paper, electrical insulation, filter paper and similar grades. Does not include wet machine board.

Tissue: Includes sanitary grades: i.e., toilet, facial, napkin, toweling, sanitary napkin, wiper and special sanitary papers, and waxing, wrapping, wadding and miscellaneous grades.

PAPERBOARD GRADES

Unbleached Kraft Paperboard: Paperboard made from a furnish containing not less than 80% wood pulp produced by the kraft sulfate process.

Linerboard: Unbleached kraft paperboard manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes. Includes solid unbleached kraft linerboard, both Fourdrinier and Cylinder, mottled white linerboard and clay coated unbleached kraft linerboard.

Folding: Paperboard manufactured, such as clay coated unbleached kraft and bleached lined unbleached kraft backed, for conversion into folding cartons and beverage carriers.

Other: All unbleached kraft paperboard whose end use is not otherwise classified, such as board for a filler for solid fiber board to be fabricated into a shipping container, tube, can, drum, file folder, tag, automotive panel, etc.

Solid Bleached Packaging Paperboard: Paperboard made for use in packaging from a furnish containing not less than 80% virgin bleached wood pulp. Bleached bristols not manufactured for packaging are included in the proper bleached bristol classification under papers.

Linerboard: Solid bleached paperboard, either Fourdrinier or Cylinder, manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Folding: Solid bleached paperboard for conversion into folding cartons, such as folding cartons for ice cream, butter, oleomargarine, frozen foods, bakery products, cosmetics, drugs, etc.

Milk Carton and Food Service: Solid bleached paperboard for conversion into milk carton, heavyweight cup, and round nested food container, plate, dish and tray, and for packaging for moist, liquid and oily foods.

Other: Solid bleached paperboard for conversion into packaging of blister pack, tubes and other products not classified above and for industrial products not classified under bleached bristols.

Semichemical Paperboard: Paperboard made from a furnish containing not less than 75% virgin wood pulp, the predominant portion of which is produced by a semichemical process.

Recycled Paperboard: Paperboard manufactured from a combination of recycled fibers from various grades of paper stock with the predominant portion of its furnish being recycled fibers: sometimes including a very minor portion of virgin fibers.

Linerboard: Recycled paperboard produced from a furnish containing less than 80% virgin kraft wood pulp and used as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Corrugating Medium: Recycled paperboard produced from a furnish containing less than 75% virgin wood pulp and used as the fluting material when combining paperboard for conversion into corrugated boxes.

Container Chip and Filler Board: Recycled paperboard manufactured as a filler for solid fiber board for conversion into solid fiber boxes and other container chipboard (all chipboard under 26 pounds per 1000 sq. ft. manufactured for use as facing corrugated, solid fiber and single faced products which are used for interior packing, e.g., pads, partitions, dividers, layers and cushioning).

Folding: Recycled paperboard manufactured with bending quality for conversion into folding cartons (including unlined chipboard, kraft lined, white lined and clay coated).

Set-up: Recycled paperboard manufactured with non-bending specifications for conversion into rigid or set-up boxes (including plain chipboard, newslined, white vat lined).

Gypsum Wallboard Facing: Recycled paperboard manufactured for use as liner or facing on gypsum board, plasterboard (includes white, cream, gray, blue and all colors).

Other: Recycled paperboard with the same characteristics as paperboard for bending packaging or non-bending packaging but for non-packaging uses; plus recycled paperboard for end uses not otherwise classified, such as tag, file folder, tube, can, drum, match stem, tablet backs, toys, etc.

CONSTRUCTION PAPER & BOARD & OTHER

Construction Paper: Sheathing paper, felts (roofing felts, floor covering, automotive felts, deadening, industrial, pipe covering, refrigerator), asbestos paper and asbestos filled paper, flexible wood fiber insulation.

Wet Machine Board: Binders board, shoe board (e.g., counter board, heel board, innersole, etc.) automotive board, chair seat backing, coaster board, luggage, mill board, panel board, table top board, etc.

Insulating Board: A fibrous-felted homogenous panel made by interfelting of the fibers (e.g.,interior building board, wallboard, sound deadening board, acoustical tile, exterior sheathing board, roof insulation board, trailer board, etc.).

WOOD PULP

Dissolving & Special Alpha: Highly refined bleached white sulfite or sulfate pulp with a high content of alpha (pure cellulose) fiber.

Sulfite Paper Grades: Paper grade pulps produced by the sulfite process. Bleached pulp must achieve a G.E. Brightness of more than 75.

Sulfate & Soda Paper Grades: Paper grade pulps produced by the sulfate or soda process. Bleached pulp must achieve a G.E. Brightness of more than 75. Semibleached pulp must achieve a G.E. Brightness of not less than 45 or more than 75.

Semichemical: High yield pulps produced with the use of some chemical agent such as neutral sulfite (N.S.S.C.); alkaline cook; chemipulp (defibrated pulp put through reaction chambers); chemi-mechanical pulp with a yield usually above 60%.

Mechanical: Fine textured, usually bright pulps, used in paper and paperboard manufacture and produced by mechanical rather than chemical processes.

Stone Groundwood: Pulp produced by grinding wood logs or bolts (usually 4 ft. in length) into relatively short fibers.

Refiner: Pulp produced by subjecting wood chips and/or residues to atmospheric or open discharge refining.

Thermomechanical: A high-yield pulp produced by a thermomechanical process in which wood particles are softened by preheating under pressure prior to a pressurized primary refining stage. Usually replaces or reduces the chemical pulp component in newsprint or groundwood papers.

WOOD PULP FOR CONSTRUCTION PAPER & PAPERBOARD

Coarse, often brown, pulps used in the manufacture of insulating board and construction paper. Also includes similar pulps if used in the manufacture of wet machine board. Excludes pulp for hard pressed board.

Stone Groundwood and Refiner: Pulps produced by the stone groundwood or refiner processes but used in the manufacture of construction paper and board.

Defibrated/Exploded: Pulps produced by subjecting wood chips to preheating and pressurized refining. Similar to the thermomechanical process except that operating variables produce an economical, coarse brown pulp suitable only for construction paper and board.

Screenings: Rejects and off-quality screenings from all grades of wood pulp except dissolving.

FIBERS

Roundwood: Comprises roundwood bolts and logs (4 feet or longer, including tree lengths) brought to the pulpmill for chipping, or chips made from primary roundwood bolts and logs at a chipmill, remote from the pulpmill.

Forest Residues: All logging residues such as portions of bolts or logs less than the minimum diameter specified by the consuming mill and poles, saplings, slash, limbs, twigs, or portions of bolts or logs not regarded as merchantable in normal pulpwood or sawlog operations. May also include merchantable portions of trees that will not be used for higher value products. Chips made from forest residues.

Manufacturing Residues: All mill residues such as slabs, edgings, trimmings, cores, planer shavings, sawdust or other wood residues of a wood manufacturing process and chips made from these residues.

Other Fibers: Cotton linters, cotton linter pulp, textile mill waste and cuttings, rags, waste rope and cordage, bagasse, flax, straw, jute, esparto, kenaf and all other vegetable fibers used in paper and paperboard manufacture.

RECYCLABLE PAPER

Mixed Papers: Number 1 and 2 mixed papers, super mixed papers, boxboard cuttings, mill wrappers.

Newspapers: Number 1 news, overissue news, super news. Any grade to be used as a news substitute.

Corrugated: Old containers both corrugated and solid fiber, container plant cuttings.

Pulp Substitutes & High Grade Deinking: Includes ledger, tabulating cards, bleached sulfate shavings (unless used as a news substitute). Envelope and bleached sulfite and sulfate cuttings, coated book stock, news and publication blanks, kraft paper and bags and all other grades not classified above.

Print free grades are reported as *Pulp Substitutes* and printed grades, if deinked, are reported as *High Grade Deinking*.